

OCE 2002

INTRODUCTION TO OCEANOGRAPHY

SYLLABUS

Course information

Number: OCE 2002

Title: Introduction to Oceanography

Credit hours: 3

Contact hours: 45

Course Overview:

This course is designed to introduce students to important concepts in the study of the oceans and basic oceanographic research. Topics covered include chemical, geological, physical and biology oceanography, as well as basics concepts in management of the marine environment. Material will be delivered in interactive lectures, and many will be reinforced with practical activities. Processes that are directly relevant to sailing, navigation and ecosystems visited will be emphasized. Many topics will also be addressed through written assignments followed by class presentations. Students will carry out their own oceanography research projects in small groups.

Course objectives:

- To provide an overview of important oceanographic processes
- To present major marine ecosystems, including trophic relationships of their inhabitants and adaptations for various environmental conditions
- To increase awareness of anthropogenic impacts in the marine environment and potential solutions

Course Outcomes:

By the end of this course, students will be able to:

- a. Explain important concepts of the water environment, including water chemistry, components of seawater, and transmission of energy
- b. Describe the factors that govern primary production in the oceans, and which areas typically have the highest rates of primary production

- c. Recognize and describe major taxonomic groups and functional groups in the marine environment
- d. Describe major marine ecosystems and their main characteristics
- e. Explain the ocean's bathymetric features based on the theory of plate tectonics
- f. Explain the world's major atmospheric and oceanic circulation patterns and the processes governing them
- g. Outline the processes governing tides and waves
- h. Summarize important concepts related to fisheries, aquaculture and management of the marine environment
- i. Read primary scientific literature and synthesize key points on a given topic

Required Material:

(1) Introduction to the World's Oceans, 10th edition. Sverdrup, K., Armbrust, V. 2008. McGraw-Hill. ISBN10: 0073376701

(2) Mask/fins/snorkel for snorkeling/scuba diving.

Course Evaluation:

The course will consist of 100 total points, consisting of five lecture quizzes, two exams, a literature review paper and a group research project.

Quiz (20 points): At the end of each section of the class (chemical oceanography, biological oceanography, geological oceanography, physical oceanography and marine management), students will take a short, 15-question quiz. Each quiz will be worth 4 points for a total of 20 points.

Exams (40 points): There will two exams, each worth 20 points. The midterm exam will cover the first three sections of the course. The non-cumulative final exam will cover the last 2 sections of the class and material related to the students' literature review presentations.

Literature review (20 points): Each student will be assigned a topic relevant to the study of the ocean and will be asked to review the available scientific literature on that topic. The students will present the results of their work in a 4-page literature review paper and an 8-minute presentation to the class. See detailed expectations at the end of the syllabus under "Guidelines for papers".

Group research projects (20 points): Students will conduct, in groups of 3 or 4, a research project to answer a scientific question related to the marine environment. This project should be carried out throughout the semester. The results will be presented in a research paper and a 10-minute group presentation to the class. See detailed expectations at the end of the syllabus under "Guidelines for papers".

Excused absences

Given the nature of this course, we expect students to participate in 100% of the activities and make-ups will be difficult to arrange. Should a student become ill or be in any other way unable to continue participating in the activities, the instructor will evaluate options to complete the course on a case-by-case basis. Excused absences, which are acceptable reasons for requesting a make-up, normally include medical (individual or immediate family only; documented), legal (accident or court case; individual only; documented), funerary (immediate family only; documented), military (call to active duty; documented), religious (customarily-observed holidays; absence pre-arranged with instructor), and special requirements of other courses and University-sponsored events (absence pre-arranged with instructor). The reason for requesting a make-up must relate specifically to the time period of the missed coursework and must be documented in writing by an involved professional, when documentation is required. The instructor retains the right to make additional inquiries concerning the documentation.

Grade Cut-offs:

<i>Earned Points</i>	<i>Letter Grade</i>
97-100	A+
93-97	A
90-93	A-
87-90	B+
83-87	B
80-83	B-
77-80	C+
73-77	C
70-73	C-
67-70	D+
63-67	D
60-63	D-
Below 60	F

* F or FF also assigned for serious academic misconduct

There is no curve in this course and students WILL NOT be awarded a higher letter grade simply because they are close to the next highest grade. However, if the exams turn out to be more difficult than anticipated, the individual exam grades may be adjusted upwards. The absence of a curve guarantees that students who earn 94 points will receive an 'A' regardless of the grade distribution

Dishonesty Policy:

Sea|mester expects all members to behave with academic integrity. Should we find evidence of academic misconduct (cheating, or complicity in academic dishonesty) by a student, we will inform the student of the action to be taken. Cheating on an exam will result in a grade of F for the course. If the offense is extremely serious, charges against the student will be brought before the Operational Director and Sea|mester Director. Consequences can include expulsion from the program.

Students with Disabilities:

Sea|mester accommodates the special needs of students with documented disabilities. Students with special needs should meet with the instructor, preferably prior to the start of the course, to make arrangements to accommodate those needs.

Intellectual Property:

Students are not permitted to take notes or record lectures by any means for the purpose of sale.

Disruption of the Academic Process:

Students are expected to show proper respect for the Instructor and for other students. Punishment will be imposed for disruption of academic process of any kind. Guidelines for punishment are based on the Sea|mester Student Handbook. If the unacceptable conduct is serious enough to warrant dismissal from the course, then the student shall receive a final grade of “W,” if he/she is passing the course, and a final grade of “F,” if he/she is not passing the course.

General Instructional Guidelines:

This course adheres to the instructional guidelines posted in the Sea|mester Student Handbook.

Tentative Schedule (exact timing depends on semester):

Week #	Topics	Associated chapter in Sea mester lecture notes
1	Introduction to Oceanography	1
	Plate tectonics and ocean floor	2
	Windward-leeward hike: geology and water energy	
	Marine provinces	3
2	Bathymetry practical part 1: make a bathymetric chart	
	Turtle conservation: tagging practical	
	Bathymetry practical part 2: analyze bathymetric features	
	Barrier reef snorkel practical	
3	Marine sediments	4
	Sediment practical	
	Water	5
	Mangrove snorkel practical	
4	Seawater	6
	Gases and nutrients in seawater	7
	Energy in water	8
	Literature review presentations	
5	Literature review presentations	
	midterm review	
	Midterm exam	
	Air-sea interactions	9
6	Ocean circulation	10
	Circulation lab: passage planning and physical oceanography	
	Waves	11

	Wave dynamics lab	
7	Tides	12
	The coast	13
	Shoreline processes lab	
	Coastal ocean	14
8	Estuaries lab	
	Marine pollution lab	
	Marine life and marine environment	15
	Productivity and energy transfer	16
9	Plankton diversity lab	
	Fisheries	17
	Sustainable fisheries practical	
	Aquaculture	18
10	Aquaculture practical	
	Climate change: causes and solutions	19
	Climate change: impacts on the oceans	20
	Marine education	
11	Marine education practical	
	Concluding class	
	Research project presentations	
12	Final review	
	Final exam	

Guidelines for papers

1. Literature review assignment

a) Literature review paper

This paper is designed to examine your ability to identify key parameters and issues arising from a literature packet for a given topic. You are encouraged to use additional sources of information, such as the internet, and textbooks, but most of your paper should be based on the scientific papers provided by your instructor.

The paper should be 4 pages long (excluding references and figures), typed in Times New Roman, 12 font, 1.5 spaced, fully justified with 1.2 inch margins.

You will be evaluated on three main components: 1) the overall organization and structure of your paper, 2) the degree of understanding and clarity of explanations and 3) style and grammar. Specifically:

- 1) Make sure that the paragraph structure is logical (one main idea per paragraph, and each paragraph should start with a topic sentence), and that you have a good introduction and a good conclusion. You should aim to synthesize information from different references into your own logical argument. AVOID simply summarize one reference in one paragraph, and then moving to a different one.
- 2) Make sure you understand the topic well, and choose what angle you want to present. This is a short literature review paper and it's OK to choose to focus on one particular aspect (e.g. Pacific gyres and Pacific plastic garbage patch, rather than plastic pollution in general). But even if you choose to focus on one topic, make sure that you provide enough general background information for a non-specialist reader to follow. Make sure that you understand the references that you cite, and that you cite anything that is not common knowledge.
- 3) Proofread your paper to fix any typos and spelling errors. Try to write clear and concise sentences.

b) Presentation

You are also required to present your findings in an 8 minute presentation. You will be evaluated on 1) the general organization of your talk, including a quality introduction and conclusion, 2) how well you understand the topic both in the presentation and in questions that follow, 3) your delivery including body language, speech, and use of visual aids and 4) your timing (should be between 7 and 9 minutes).

2. Group research projects

a) Research Paper

Research papers should be divided into 6 sections: Abstract, Introduction, Methods, Results, Discussion/Conclusion and References. Each of these sections should be labeled. The paper should be typed in Times New Roman, 12 font, 1.5 spaced, fully justified with 1.2 inch margins. There is no limit on how long the paper should be.

Abstract

Short (max. 250 words) summary of your research and its findings.

Introduction

Provide enough background information to explain your project.

State the relevance, i.e. why this research is important.

Clearly state the problem/purpose/hypothesis.

Justify your hypothesis, i.e. why you think that your hypothesis is true.

State the objectives of the project and what you intend to accomplish.

In order to do any of the above, you must refer to external sources such as textbooks, articles and the internet (take caution).

Methods

Make sure you mention all the equipment you used in your research.

Materials should be mentioned in sentence form describing how they were used, i.e. a refractometer was used to measure the salinity of the water.

Describe all the procedures well enough that someone could replicate your experiment.

Describe how the data was analyzed.

Include the time, date and location in this section.

You may find it necessary to refer to external sources and articles when writing your protocol.

Results

Choose tables, graphs and/or statistics that best present your results (eg. means and ranges)

Give a written description of the general trends of your results.

Do not interpret your results

In the written description refer to tables and graphs, i.e. As temperature increases the concentration of dissolved oxygen decreases (Figure 2).

Give actual values to illustrate your point, i.e. The average dissolved oxygen concentration was 6.7 ppm.

Label your graphs and tables. Figure 1 The Relationship between Dissolved Oxygen and Salinity.

If you present your data in a graph you don't need to include a table as well unless it helps you illustrate a point.

Include all your relevant data.

Discussion/Conclusion

Interpret your data and draw valid conclusions.

State problems with your data and how they affect your results.

Suggest ideas for further research.

Refer to your actual data, i.e. The dissolved oxygen concentration was higher in cold water (7.0 ppm) than in warm water (6.5 ppm).

You may find it worthwhile to refer to external sources and articles when writing your discussion.

Science does not prove anything. When interpreting your data, do not say things like “this proves that cold water holds more oxygen than warm water.” Instead say “the data suggest that cold water holds more oxygen than warm water”. Only if you conduct a test of significance (statistical test) can you say “there is a significant difference between the amount of dissolved oxygen cold water can hold and the amount of dissolved oxygen warm water can hold.”

References

See below

Research papers will also be graded on several other factors: creativity, writing style and presentation of ideas, use of complete sentences and grammar, depth of understanding, amount of effort and organization.

b) Presentation

You are also required to present your findings to the group in a 10 minute talk. You will be evaluated on 1) the general organization of your talk, including a quality introduction and conclusion, 2) how well you understand the topic both in the presentation and in questions that follow, 3) your delivery including body language, speech, and use of visual aids and 4) your timing (should be between 9 and 11 minutes).

3. Citing References

When referring to external sources and articles, use both in-text citations and a literature cited section. If there is an in-text citation, it should also appear in the literature cited section and vice versa. External sources should only be included if you used their ideas in your paper. If you read an external source but did not include those ideas in your paper, do not refer to them in in-text citations or in the literature cited section.

In your essays, every time you refer to someone else’s work you need to cite the author. For example: “In the 1990’s total fisheries leveled off at 90 million metric tons (Halloway, 1999).” You will need a new citation every time you refer to a different author even if that occurs within the same sentence, i.e.: “Dissolved oxygen concentration increases as temperature decreases (Pinet, 1999) and salinity decreases (Duxbury and Duxbury, 1996).” **Each new point**

should have at least one in-text citation unless common knowledge. You should reference the same author multiple times if you write several sentences that come from the same source.

In-Text Citations (References)

Most in-text citations will have one of the three following formats:

For one author: (Pinet, 1999)

For two authors: (Duxbury and Duxbury, 1996)

For more than two authors: (Duxbury et. al. 2000)

For example: Dissolved oxygen concentration increases as temperature decreases (Pinet, 1999; Duxbury et al. 2000) and salinity decreases (Duxbury and Duxbury, 1996). When more than one paper is being referenced they should be in order of date (eg Pinet, 1999; Duxbury et al. 2000)

Reference Section

This section should be alphabetized by author first and then by date.

For journal articles: Authors. Year. Name of Article. *Name of Journal* Volume # (Edition #): pages.

With one author: Gonzalez, F. I. 1999. Tsunami! *Scientific American* 280 (5) 56-65.

With two authors: Giese, G. and D. Chapman. 1993. Coastal Seiches. *Oceanus* 36 (1) 38-46.

With more than two authors: Schlee, J.S., D. W. Folger, W.P. Wilson, K.D. Klitgord and J.A. Grow. 1979. The Continental Margins of the Western North Atlantic. *Oceanus* 22 (3) 40-7.

For textbooks: Authors. Year. *Title of Book*. City, State: Name of Press.