

OCEANOGRAPHY 10

Introduction to Oceanography

Section: 1336, Fall 2009

4 units, 3-hour lecture, 3-hour lab

Instructor Information

Instructor: Dr. C. Charles Dong

Email: cdong@atmos.ucla.edu

Website: www.atmos.ucla.edu/~cdong/oceanography

Phone: 310-794-5899 (o)

Class Meetings: Lab: Tuesday 6:30-9:40pm
Lecture: Thursday 6:30-9:40pm

Classroom: NATS 218

Office hour: Tuesdays (5:00-6:00pm), office: NATS 209

For my research on oceanography,
Please refer to my research website: www.atmos.ucla.edu/~cdong.

Required Texts:

1. Essentials of Oceanography (the 2nd custom edition for ECC) by A. Trujillo and H. Thurman
2. Exploring Southern California Oceanography (14th edition)
Lab Manuals for Oceanography 10 ECC

Course Description

This introductory course in oceanography presents oceans in terms of physical, geological, chemical and biological environments. The topics include: sea water chemistry, air-sea interaction, oceanic currents, waves, tides, plate tectonics, oceanic sediments, coastal processes, biological productivity and animals in pelagic and benthic environments.

Prerequisites

There are no prerequisites for this course, but eligibility for English 84 is recommended.

Course Objectives

Students who pass this course will be able to

1. Describe the chemical and physical properties of water and sea water, explain these properties in terms of the behavior of atoms and molecules. Also, they will be able to explain how these properties affect the behavior and movement of seawater.
2. Describe and explain how the ocean and atmosphere interact with one another, especially how the ocean affects climate and the impact that global warming will have on the ocean.
3. Describe the surface and deep circulation of the ocean, and explain the observed motion of the ocean in terms of wind forcing, the Coriolis effect and density differences.
4. Describe the formation of waves (wind-generated, internal and tsunami), and explain how wave phenomena such as refraction, reflection, standing waves and wave dispersion affect their propagation and characteristics (e.g., wavelength, height and period). Also, explain how and why waves change as they shoal, and how coastal variations can produce different breaking patterns.
5. Explain the observed daily and monthly cycles of the tides using the equilibrium and dynamic theories of the tides, and explain how local conditions (e.g., shoreline, shape, weather) can affect tidal patterns.
6. Use the theory of plate tectonics to explain observed features of the earth's surface including continents and ocean basins, earthquakes, fossil remains, islands, mountains, ocean ridges, trenches, and volcanoes. Also, they will be able to use observations of the earth to assess the validation of the theory of plate tectonics.
7. Explain the origin of coastal features such as sandy and rocky beaches, headlands, coves, sea arches, sea stacks, wave-cut and marine terraces, barrier islands, spits and tombolos in terms of wave conditions, tides, and changes in sea level.
8. Explain the origin, movement, modification, and deposition of marine sediments in terms of the physical, chemical, and biological conditions affecting them.
9. Describe and explain the spatial and temporal distribution of ocean primary productivity (algal growth) in terms of the availability of sunlight and nutrients.

Describe the flow of energy and nutrients into, through, and out of marine food webs, and analyze how human actions can disrupt food webs.

10. Describe special adaptations of marine organisms, and explain how these adaptations promote their survival and reproduction under the unique physical and chemical conditions found in the ocean.
11. Interpret contour maps, and find locations, measure distances, and take into account scaling factors on nautical charts. (Map Skills).
12. Solve problems using dimensional analysis, and calculate percentages, areas, and volumes. (Math Calculation Skills).
13. Prepare and analyze graphs, including time-series graphs, histograms, multivariate graphs, scatter plots and pie charts. (Math Graphing Skills).
14. Make and describe observations, propose hypotheses and experiments to test hypotheses, and present an argument supporting and undermining hypotheses in terms of the observations.

Methods of Evaluation

Grading

Exams	50%
Labs	20%
Homework	10%
Presentation	10%
Attendance and in-class activities	10%
Total	100%

Note: NO make-up exams or laboratories without prior content of instructor or for medical reasons. A=90% and above; B: $\geq 80\%$ and $< 90\%$; C: $\geq 70\%$ and $< 80\%$; D: $\geq 60\%$ and $< 70\%$; F: $< 60\%$.

- **Exams:** there will be four one-hour exams and one final exam (see the schedule) consisting multiple choices, essay questions and diagrams.
- **Labs:** In general, students may work in groups of up to 5 student on labs (I will assign students to groups). Each student must participate in the work on all questions. Questions may not split up among students. No students should copy directly from another student's labs. Students are permitted to discuss with other students but when you write down the answer in your own words and your own way.

- **Homework:** we will have reading assignments (not graded) and homework. There will be five times of homework. Each homework will be due at the beginning of the class when the next homework is assigned.
- **Presentations:** each student will present 15-20 minutes demonstration on a topic at their own choice regarding the oceanography. Dates will be selected and put on the class calendar.
- **Attendance and in-class activities:** Roll will be taken at each class meeting. Students are expected to attend every lecture and laboratory meeting.

Alternative Site Activities (ASA):

Some of activities in this class are designed Alternative Site Activities (ASA). These are hands-on projects which will be conducted at specified off-campus locations. Students will be responsible for their own transportation to the location, and must complete and turn in the Field Trip Waiver form during the first week of classes.

Lecture Notes:

Lecture slideshows will be posted online and they will be available within 24 hours after each meeting for download and viewing for one week only. Slideshows can not be used as a substitute for lecture.

How to Succeed in the course

Every student is capable of make a success in the course though the material in the course is challenging. This requires spending time on the subject outside of class. According to a general rule of thumb for success in a college class is to multiple the number of units by two and spending the number of hours studying the materials outside of class. Since the course is 4 units, that means you are expected 8 hours per week in individual review. Here are the tips for a success:

- Attend all the classes
- Take notes during lectures
- Read the reading assignments
- Finish homework
- Ask questions and answer questions in class

Student Learning Outcomes

Students can identify the salient features of the basic concepts of oceanography.

Students recognize and can accurately articulate how the ocean affects humans' lives and how human activities affect the ocean

Students can identify the key elements of the scientific method (hypotheses, tests, observations, conclusions/interpretation of observations) in popular accounts of scientific Research in magazines, newspapers, etc.

Non-Discrimination Policy

The policy of the El Camino Community College District is to provide an educational and employment environment in which no person shall be unlawfully denied full and equal access to, the benefits of, or be unlawfully subjected to, discrimination on the basis of ethnic group identification, national origin, religion, age, sex, race, color, ancestry. Sexual orientation, physical or mental disability in any program or activity that is administered by, funded directly by, or that receives any financial assistance from, the State Chancellor or the Board of Governors of the California Community Colleges.

Students with disabilities who believe they may need accommodation in this class are encouraged to contact the Special Resource Center on campus as soon as possible to better ensure such accommodations are implemented in a timely fashion. As well please contact me privately discuss your specific needs

Classroom Regulations

A respectful behavior is expected of each student in the classroom. Do not use any rude or dirty words in the classroom either in discussions or asking/answering questions. Use of cell phones during classes is both inappropriate and considered rude behavior towards your classmates and instructor. Cell phones should be switched to "vibration" mode. It will not be tolerated. No smoking in the classroom. In the classroom behavior will be included in the credit.

Consequence from Cheating

The ECC has a clear policy about cheating. If I judge you to have copied an assignment or cheated on a test, you will receive no credit for the assignment or the test at the very least. I will reserve the right to fail students who cheat and/or report them to the college.

Schedule for Oceanography 10
Section 1336, Fall 2009
Instructor: Dr. C. Charles Dong

Week	No	Day of Week	Date	Topic
1 st	1	T.	Sep. 01	Introduction, Course Outlines, Exercises, Map Skills (Exe. 1)
	2	Th.	Sep. 03	<i>Chapter 1: Introduction to Planet Earth</i>
2 nd	3	T.	Sep. 08	ASA Sandy Shoreline: water and seawater chemistry I (Exe, 6)
	4	Th.	Sep. 10	<i>Chapter 5: Water and Sea Water</i>
3 rd	5	T.	Sep. 15	ASA Pier: Water and Seawater Chemistry II (Exe. 6)
	6	Th.	Sep. 17	<i>Chapter 6: Air-Sea Interaction</i> presentation topic due
4 th	7	T.	Sep. 22	ASA Rocky Shoreline: Shorelines (Exe. 12)
	8	Th.	Sep. 24	Exam 1 (Chapters 1, 5, 6); <i>Chapter 7: Ocean Circulation</i>
5 th	9	T.	Sep. 29	Lab: Contour Maps and Profiles (Exe. 2)
	10	Th.	Oct. 01	<i>Chapter 8: Wave and Water Dynamics</i>
6 th	11	T.	Oct.06	Lab: Waves (Exe. 9)
	12	Th.	Oct. 08	<i>Chapter 9: Tides</i>
7 th	13	T.	Oct. 13	Lab: Tides and Tsunami (Exe. 10, 11)
	14	Th.	Oct. 15	Exam 2 (Chapters 7, 8, 9); <i>Chapter 2: Plate Tectonics and the Ocean Floor</i>
8 th	15	T.	Oct. 20	Lab: Plate Tectonics (Exe 3)
	16	Th.	Oct. 22	<i>Chapter 3: Marine Provinces</i>
9 th	17	T.	Oct 27	Lab: Ocean Currents (Exe 8)
	18	Th.	Oct. 29	<i>Chapter 4: Marine Sediment</i>

Week	#	Date of Week	Date	Topic
10 th	19	T.	Nov. 03	Lab: Sediments (exe. 4)
	20	Th.	Nov. 05	Exam 3 (Chapters 2, 3, 4); <i>Chapter 10: The Coast: Beaches and Shoreline Processes</i>
11 th	21	T.	Nov. 10	Lab: Sedimentary Rocks (Exe 5)
	22	Th.	Nov. 12	<i>Chapter 11: The Coastal Ocean</i>
12 th	23	T.	Nov. 17	Lab: Coral Reefs (Exe. 15)
	24	Th.	Nov.19	Exam 4 (Chapters 10,11); <i>Chapter 13: Biological Productivity and Energy Transfer</i>
13 th	25	T.	Nov. 24	Lab: Primary Productivity (Exe 14)
	26	Th.	Nov. 26	No Class Meeting --- Thanksgiving Day
14 th	27	T.	Dec. 01	Lab: Remote Sensing (Exe 13)
	28	Th.	Dec. 03	<i>Chapter 14, 15: Animals of the Pelagic and Benthic Environment</i>
15 th	29	T.	Dec. 08	Lab: Climate Change (Exe. 7)
	30	Th.	Dec. 10	<i>Lecture: Satellite Remote Sensing in Oceanography</i>
16 th	31	T.	Dec. 15	Lab/Lecture Review: Oceanic Role in the Climate Change and Environment Protection
	32	Th.	Dec. 17	Final Exam

Good Luck!
Have A Successful School Year !!!