

## GEOL 3070: Introduction to Oceanography Syllabus - Spring 2008

**Meets:** Tuesdays and Thursdays, 11:00-12:15 pm, Benson 180

**Professor:** Tom Marchitto, tom.marchitto@colorado.edu

**Office hours:** Tues 2:00-4:00, or by appointment, Benson 435

**Required text:** Garrison, *Oceanography: An Invitation to Marine Science*, 6<sup>th</sup> ed.

**Webpage:** <http://instaar.colorado.edu/marchitto/3070syllabus.html>

**Webpage lecture access:** Login: IO, Password: ocean

**Prerequisites:** any two-course sequence of natural science core courses

**Approved for** arts and sciences core curriculum: natural science (3 credits)

**Course description:** Investigates the broad-scale features and dynamics of the Earth's oceans. The course is roughly divided amongst the four main disciplines of oceanography: marine geology, marine chemistry, physical oceanography (i.e., circulation), and marine biology. Students will learn that there is much overlap and interdependence between these disciplines. Specific topics include seafloor spreading, marine sediments, salinity, biogeochemical cycles, ocean structure, currents, waves, tides, primary production, marine ecology, global warming, and much more.

**Grading:** 30% homework, 40% midterm exams, 30% final exam. Letter grades for exams will be based on a class-wide curves. Homeworks will not be curved.

**Homework:** Five homework assignments will allow students to apply what they have learned in class to practical problems. Some basic (high school level) math and critical thinking will be required. Assignments are to be handed in during class. *Late assignments will lose 10% credit per day (not per class meeting).*

**Exams:** There will be three midterm exams (worth 20% each), but students may drop their lowest midterm grade. *The final, which is cumulative, cannot be dropped.* Exams will test students' understanding of oceanographic concepts and facts. Exams missed due to illness may only be made up if a doctor's note is provided. *Final exam is Monday May 5, 1:30-4:00 pm, in Benson 180.*

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**Religious or other obligations:** If you have any conflicts with scheduled exams because of religious or other obligations, please notify me at least two weeks in advance of the conflict to request special accommodation. See class webpage for link to Registrar's policy on final exam conflicts (three on same day).

**Disabilities:** If you qualify for accommodations because of a disability, please submit to me a letter from Disability Services within the first two weeks of class, so that your needs may be addressed. Disability Services determines accommodations based on documented disabilities. (303-492-8671, Willard 322, [www.colorado.edu/disabilityservices](http://www.colorado.edu/disabilityservices))

**Note on academic honesty:** Students are allowed to work together on homework problems, but are not allowed to simply copy each other's work. Copying constitutes cheating under the CU Honor Code. ([www.colorado.edu/academics/honorcode](http://www.colorado.edu/academics/honorcode))

date	lecture subject	representative topics	required reading (Garrison 6 <sup>th</sup> Ed)	hw
15-Jan	Oceans and oceanography	world ocean, origin, history of oceanography, challenges	1.1-1.3; 1.24-1.25; 2.6-2.7	
17-Jan	Ocean crust and bathymetry	layered Earth, isostatic equilibrium, continental margins, ocean basins	3.1-3.10; 4.1-4.12; 4.16-4.17	
22-Jan	Plate tectonics	seafloor spreading, convection, paleomag, hotspots	3.11-3.16; 3.23-3.25	1 out
24-Jan	Plate boundaries	mid-ocean ridges, subduction zones, transforms	3.18-3.22; 4.13-4.15; 4.18-4.19	
29-Jan	Marine sediments	sizes, Stokes Law, terrigenous, calcareous, siliceous	5.1-5.19	1 due
31-Jan	Seawater properties	heat, temperature, density, light, sound	6.1-6.12; 6.20-6.26	
5-Feb	Chemistry of seawater	salinity, steady state, residence time, inputs, outputs	7.1-7.11	2 out
7-Feb	<b>First Exam</b>	covers 1/15-1/31, oceans to seawater		
12-Feb	Biogeochemical cycles	photosynthesis, respiration, Redfield ratios, nitrogen, phosphorous, oxygen	7.12-7.14; 7.16; 13.4; 13.10; 13.12-13.13	2 due
14-Feb	Carbon cycle	fluxes, DIC, alkalinity, pH	7.15; 7.17; 13.11; 13.21	
19-Feb	Global atmospheric circulation	heat transport, Coriolis effect, atmospheric cells	6.13; 8.4-8.13; Appendix V	3 out
21-Feb	Upper ocean circulation	Ekman transport, geostrophy, gyres	9.1-9.6; 9.22	
26-Feb	Upwelling and El Niño	coastal and equatorial upwelling, ENSO dynamics	9.10-9.15	3 due
28-Feb	Deep ocean circulation	vertical structure, thermohaline flow, heat transport	6.15-6.19; 9.16-9.21	
4-Mar	Waves at sea	wave forces, deep vs. shallow, wind waves, sea state	10.2-10.14	
6-Mar	<b>Second Exam</b>	covers 2/5-2/28, chemistry to deep ocean circulation		
11-Mar	Waves at the shore	breaking, refraction, seiche, tsunami	10.1; 10.15-10.16; 10.23-10.29	4 out
13-Mar	Tides	Earth-moon-sun gravitation, amphidromic points	11.1-11.14; Appendix VII	
18-Mar	Coasts	primary vs. secondary, beaches, reefs, erosion	12.2-12.23	4 due
20-Mar	Life in the sea	classification, adaptations, environments	13.1-13.2; 13.17; 13.23; 13.25; Fig. 13.26; 15.20-15.24; Appendix VI	
25, 27	<i>Spring Break</i>			
1-Apr	Primary producers	production, phytoplankton, seaweeds, seasonal cycles	13.6; 14.1-14.11; 14.13-14.16	
3-Apr	Pelagic marine heterotrophs	energy & mass transfer, zooplankton, squid, fishes	13.3; 13.8; 14.12	
8-Apr	<b>Third Exam</b>	covers 3/4-4/1, waves to primary producers		
10-Apr	Fishes and cetaceans	fish classes, toothed whales, baleen whales	15.16-15.19; 15.35-15.38; 16.16	
15-Apr	Benthic marine communities	ecology, rocky vs. sandy shores, coral reefs, deep sea	16.2-16.15; 16.17; 16.21	5 out
17-Apr	Chemosynthetic communities	hydrothermal vents, cold seeps, whale falls	13.5; 16.18-16.20	
22-Apr	Marine resources	Law of the Sea, fossil fuels, direct energy, fisheries	17.1-17.21; 17.24-17.31	5 due
24-Apr	Marine pollution	toxicity, oil, sewage, eutrophication, plastics	18.2-18.11; 18.19	
29-Apr	Global warming and the ocean	Greenhouse effect, ocean warming, sea level rise, acidification, carbon sequestration	18.22-18.25	
1-May	Review	course overview, final exam preview	Appendix IX, if interested	