

Oceanography 2013: GEOL/ATOC 4060 / 5060

Lecturer: Dr. Chris Jenkins
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Lab Instructor: Evan Anderson
(Evan.P.Anderson@colorado.edu)

Location: Benson Building 1B75 (Geology, basement) for Lectures,
other rooms TBA for Labs and Office Hours

Web Page Dateline: 1200h, Jan 14 2013



This course introduces students to a selection of more advanced topics in Oceanography: new mapping technologies, the cryosphere and ocean circulations, mixing due to flows and turbulence, equations of fluid motion concepts, the questions surrounding carbon, sediment dynamics, and scales of human impact. It is certainly directed to the science, but also to the present 'big data' environment of science methods. It gives students some hands-on experience of the project/data/presentation/feasibility activities that most oceanographers will be employed in.

EMAIL, ETC:

Please use email for all communications.
Start all the emails with "Oc:" (or they may automatically go to 'Junk').
Chris Jenkins' office is on East Campus.

For computer security, please do not link to these web pages and close your browser completely after sessions.

HOURS:

Lectures: 1400h -1450h Mondays; 1400h - 1550h Fridays

Lab: 1500h - 1650h Mondays

Office hours: 3hrs / week; at times TBD;

Also if needed:

Chris Jenkins: By appointment

TA: Office Hours or by Appointment

TEXTBOOKS & LEARNING MATERIALS:

These books are recommended, but most course materials will be from contemporary web resources and science publications

(1) Waves, Tides and Shallow-Water Processes: J. Wright, A. Colling, & D. Park: Butterworth-Heinemann, Oxford UK, 1999, 2nd Edition, 227 pp.

(2) Ocean Circulation: A. Colling: Butterworth-Heinemann, Oxford UK, 1999, 2nd Edition, 286 pp.

plus:

(3) Oceanography: An Invitation to Marine Science: T. Garrison, Cengage Learning, Belmont, CA, 8th Edition, 605pp

(Note this is the textbook for the 3070 course, and it is recommended for the 'basic knowledge')

(4) Lecture media, course and external web pages, video segments, scientific publications as identified during the classes.

The books can be obtained through the campus bookshop or online.

TOPICS LIST

The Powerpoints, Documents and Web links for each topic will be activated on the course webpages as we proceed through the term.

- Light and Sound in the Oceans
- Ocean Basin Structure and Seafloor Mapping.
- Water, Ice and Temperature
- Salinity, Density, and Mixing
- Carbon and Acidification
- Air / Sea Interactions, Turbulence
- Equations of Motion
- Surface Currents (Equatorial and Western Boundary)
- Deep Ocean Circulations (Thermohaline)
- Tides and Internal Waves
- Surface waves
- Sedimentation and Sediment Transport
- Coasts and Sea Level

- Human Impacts and Mitigation

GRADING:

Students are responsible for knowing the material presented in lectures and labs and in the assigned textbooks.

Essay and choice questions will be the normal style of tests.

The essay answers will be limited in length and may given be in prose, bullet points, and/or labelled diagrams.

Grading Components:

Midterm Test: 15% of final grade

Large Project and Presentation: 25% of final grade

Draft Environmental Impact Statement for an imagined engineering project somewhere in the world ocean (topics to be approved by the professor). Use the web, spreadsheets and mapping systems (GIS) to assemble data on the ocean conditions, engineering challenges and environmental sensitivities. A 10pp paper plus figs, refs. Most of the course labs are devoted to the project. A 15min class presentation is required. Undergraduate (4060) students may work on their project in groups of two; Graduate (5060) students will work solo.

Presentation & Paper on Advanced Instrumentation: 15% of final grade

Prepare a 10-min spoken presentation and 3 page+figs+refs report on some chosen instrumentation technology (topics to be approved by the professor). Undergraduates may work in pairs, graduates will work solo.

Class assignments & Participation: 10% of final grade

Regular attendance is required at classes and labs.

Laboratory Exercises: 20% of final grade

Final Test: 15% of final grade

Grading arrangements:

The lab write-ups are due at the beginning of the next lab session (unless otherwise noted) and will be returned after marking at the beginning of the following lab meeting.

I will accept labs late without penalty if you have timely, adequately documented medical reasons or family emergencies. Please notify me of these as soon as possible.

In other cases, labs that are submitted late will suffer a 10% reduction in score per week for 2 weeks maximum.

EXTRA NOTES:

Prerequisites: Please see the CU Course handbooks or a counselor

Expectations: You should already have skills in scientific thinking, spatial visualization, simple mathematical equations (algebra), chemical notation, and use of computers.

Approved for: Please see the CU Course handbooks or a counselor

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.

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.

Integrity: 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.