

Syllabus: SIO 119 Physics and Chemistry of the Ocean

Professor Andreas Andersson

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Lectures: Monday/Wednesday/Friday 2:00-2:50, Eckart Hall 227

Discussion: Wednesday, 1:00-1:50 (in Eckart Hall 227) or 3:00-3:50 (in Eckart Hall 227)

Final exam: Monday, March 18 2016, 3-6 pm. (Location TBD).

Office hours:

TA: Fridays, 9:00-10:20 am; Keck 150 (Conference Room).

Professors: Prof Gille: Thursdays, 8:30-10:00 am; TBD and by appointment: We're always available in the classroom before and after class, and we respond to e-mail.

Grading: Letter or P/NP permitted.

Course public website: <http://pordlabs.ucsd.edu/sgille/sio119>

Consult TritonEd for announcements and course specific materials.

Objectives: This course will help you master the key elements of physical and chemical oceanography that influence marine ecosystems. The course uses an interdisciplinary approach to examine how properties of sea water, ocean currents, air-sea forcing, and chemical processes determine the marine environment, and we examine specific examples relevant to nutrient availability, ocean acidification, and biological productivity.

Lectures, in-class discussion, weekly assignments, term papers and exams will ask you to think and synthesize material.

Specifically, by the end of the course, you should understand, and be able to discuss:

- the basics of the ocean heat and freshwater budgets;
- factors determining the density of sea water;
- locations of major ocean currents and processes driving these currents;
- factors influencing vertical motions in the ocean;
- origin of elements and basics of ocean chemistry;
- the ocean carbon cycle;
- impacts of rising CO_2 concentrations in the atmosphere, as pertaining to ocean climate and ocean acidification.

Maintaining Academic Integrity: Students agree that by taking this course all required papers will be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the terms of use agreement posted on the Turnitin.com site.

This course will also adhere to the standard UCSD policy on academic integrity: “Students are expected to do their own work, as outlined in the UCSD Policy on Integrity of Scholarship. Cheating will not be tolerated, and any student who engages in forbidden conduct will be subjected to the disciplinary process. Cheaters will receive a failing grade on the assignment or the exam and/or in the entire course. They may also be suspended from UCSD.” See <http://www-senate.ucsd.edu/manual/Appendices/app2.htm> for details.

Reading: Required reading will be made available in electronic form. (This may include book chapters, lecture notes, journal articles or other materials.)

Grading:

- 20% homework, participation, discussion section attendance. Homework and discussion are focused on helping you understand material discussed in class. Normally due weekly, on Fridays.
- 20% midterm (Friday February 15, wk 6)
- 30% final exam (Monday, March 18 (3-6 pm, exam week)
- 10% extended assignment 1
- 10% extended assignment 2
- 10% group project (poster presentation on Wednesday March 13), in discussion section and class. 1 page individual synopsis due at time of presentation.
- Exceptional participation can boost your overall grade.
- Late assignments will not normally be accepted. Provided that >90% of the class complete CAPE evaluations, the lowest homework grade will be dropped.

Draft schedule highlights. (See web for full details and reading assignments.)

- **Week 1:** Introduction to the class; origins of the universe.
- **Week 2:** Sea water, climate, tides and ocean circulation.
- **Week 3:** Field trip, tide pool processes.
- **Week 4:** The carbon cycle. Extended assignment #1 assigned.
- **Week 5:** Ocean circulation.
- **Week 6:** Impacts of ocean circulation; midterm review; midterm.
- **Week 7:** Upwelling and nutrients.
- **Week 8:** High-nutrient, low-chlorophyll regions.
- **Week 9:** The California Current, oxygen minima, coastal upwelling.
- **Week 10:** Coral reefs, El Niño; poster session; final course summary and review.

Tide pool field trip Wednesday, January 23 during discussion and class time. (Low tide at 5:06 pm.) We'll walk to the tide pools at the north end of La Jolla Shores beach. Plan for a flexible schedule, as not everyone can be in the tide pools at the same time. We'll sub-divide into groups so that everyone can participate.

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