Field and Lab Methods in Aquatic and Coastal Science

Environmental Sciences 150; Ocean Sciences 250
Satisfies PR-E (Collaborative Endeavor)

Instructors:
Carl Lamborg (OS Professor) and Eve Pugsley (TA; OS Grad Student)

Learning Outcomes:
In a 10-week class, each student will become familiar with some of the core measurement and sampling techniques routinely employed by working aquatic scientists. In keeping with the multi-disciplinary nature of aquatic science, these techniques and measurements will include those taken from biology, geology, chemistry and physics.

In addition to the practical knowledge gained, the class will have an overarching goal of having students become deeply familiar with a field site and observing it over an extended period of time. Through repeat visits and observations, the students will become "attuned" to this location, and this familiarity will allow them to connect quantitative measures with their own intuition gained from spending time in the field. In addition, and as a result of natural variations in the environment, various aspects of the field site will no doubt change during the course of a quarter which will also offer the students a ringside seat to the sometimes fast and sometimes slow changes that happen in all natural environments.

The field and sampling component of the work will be conducted largely at UCSC's Younger Lagoon Research Reserve, located adjacent to the Long Marine Lab on the coastal campus. The various materials sampled will be returned to main campus and processed and analyzed in either the Ocean Science Teaching Lab (E&MS D266), the Marine Analytical Lab (E&MS C480) or in the Lamborg Lab (E&MS C580).

Students will be grouped into teams, and each team will undertake sampling and analysis efforts focused on one of the four sub-disciplines listed above in each field/lab week pair (see nominal schedule below). The sub-discipline focus will change every two weeks so that by the end of the quarter, each team will have worked through each of the four sub-disciplines. This leaves two additional weeks, which are the first and last meetings of the class. The first week class will include the only proper lecture period where class logistics and expectations are discussed and a tour/familiarization with the lab spaces in the Earth and Marine Sciences Building where lab work will be done. The last class meeting, in Week 10, will include presentations from each team summarizing and examining the results collected during the quarter, with each team focusing on a topic to be determined (drawn from class data).

The students will:

- Gain knowledge of sampling and analytical techniques through doing.
- Work as part of team to complete all the necessary work each week.
- Maintain clear and usable field and lab notebooks such that they are useful to all team members.
- Upload data to a server so that it can be used by all teams.
- Summarize, visualize and present time series data at the end of the quarter that include both discrete and near-continuous data sets.

- Explore, through readings and the class data sharing protocols, the increasingly important topic of data repositories and the larger concept of "collaboration" in the digital era.

Grading:
The students will be assessed through examination of their field and laboratory notebooks, the completion of their share of the collaborative work and their participation in the final data presentations:

Participation: 60%
Weekly Data Reports: 30%
Presentation: 10%

Materials:
Students must purchase one Rite in the Rain notebook and pen. An additional regular lab notebook can be purchased if necessary.
Students must download a copy of the Course Reader.

Reading:
Students must familiarize themselves with relevant section in the Course Reader prior to their time in the field and lab.

Meeting Times:
The class will meet twice a week (TTh), nominally 2:30 – 5:00 pm, though the exact times will vary due to bus schedules. Tuesdays will nominally be field days while Thursdays are lab days. We will meet the first Tuesday in the Ocean Sciences teaching lab (E&MS D266).

Resources:
DRC: UC Santa Cruz is committed to creating an academic environment that supports its diverse student body. If you are a student with a disability that requires accommodations to achieve equal access in this course, please submit your Accommodation Authorization Letter from the Disability Resource Center (DRC) to me privately during my office hours or by appointment, preferably within the first two weeks of the quarter. At that time, I would also like us to discuss ways we can ensure your full participation in the course. I encourage all students who may benefit from learning more about DRC services to contact DRC by phone at 831-459-2089 or by email at drc@ucsc.edu.
CARE and Title IX: Title IX prohibits gender discrimination, including sexual harassment, domestic and dating violence, sexual assault, and stalking. If you have experienced sexual harassment or sexual violence, you can receive confidential support and advocacy at the Campus Advocacy Resources & Education (CARE) Office by calling (831) 502-2273**.** In addition, Counseling & Psychological Services (CAPS) can provide confidential, counseling support, (831) 459-2628. You can also report gender discrimination directly to the University's Title IX Office, (831) 459-2462**.** Reports to law enforcement can be made to UCPD, (831) 459-2231 ext. 1. For emergencies call 911.

Table 1.1: Class Schedule

Week	Tuesday Activity	Thursday Activity	Team A/D	Team B/E	Team C/F
1	General and Lab Introduction	Field Introduction			
2	Field 1	Lab 1	BIO	CHEM	PHYS/GEO
3	Field 2	Lab 2	CHEM	PHYS/GEO	BIO
4	Field 3	Lab 3	PHYS/GEO	BIO	CHEM
5	Field 4 Antonelli Pond	Lab 4 Mid-Quarter Debrief			
6	Field 5	Lab 5	BIO	CHEM	PHYS/GEO
7	Field 6	Lab 6	CHEM	PHYS/GEO	BIO
8	Field 7	Lab 7	PHYS/GEO	BIO	CHEM
9	Field 8 - Wharf	Lab 8			
10	Data Reduction and Discussion	Presentations			