

SYLLABUS: Coastal Ocean Studies ES 545

Spring 2006

4 credits

Friday 12 – 4, Shannon Point Marine Center

Instructor:

Dr. Suzanne Strom

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Course Goals:

Develop familiarity with current pressing issues in coastal ocean science.

Gain skills necessary to research and evaluate multi-disciplinary phenomena in the marine environment.

Apply principles of chemistry, biology and physics to understand coastal ocean processes.

Gain exposure to primary scientific literature.

Improve oral and written communication skills.

Print Resources : (on reserve in Rm 218, Sundquist Lab)

Invitation to Oceanography (3rd ed.), P.R. Pinet (2003)

An Introduction to the Chemistry of the Sea, M.E.Q. Pilson (1998)

An Introduction to Marine Biogeochemistry, S.M. Libes (1992)

Biological Oceanography, C.B. Miller (2004)

Dynamics of Marine Ecosystems: Biological-Physical Interactions in the Oceans (2nd ed.),
K.H.Mann and J.R.N. Lazier (1996)

Open University Series texts:

Ocean Circulation (1989)

Ocean Chemistry and Deep-Sea Sediments (1989)

Proceedings of the BC/Washington Symposium on the Marine Environment R.C.H. Wilson et al.
(eds.) 1994

Readings from scientific journals, including:

Marine Chemistry

Limnology and Oceanography

Harmful Algae

Oceanography

We will also make use of web-based resources, including satellite imagery, links to real-time data collection (e.g. from in situ instrumentation), and web-based ocean chemistry resources.

Course Description

The course consists of one week of introductory material followed by three 3-week units (see below), each focused on a different coastal ocean issue. Each issue is of importance in current marine science and policy arenas. Additionally, each is an example of the kinds of problems students will become involved with if they go on to work in government research and monitoring agencies or marine science-oriented environmental consulting firms. Learning to gather existing information, consider problems from a multi-disciplinary perspective, and communicate findings and opinions to others are important skills in these (and other) work areas.

The course emphasis on ocean chemistry, with ties to related biological and physical issues, is intended to complement my other graduate course in Biological Oceanography as well as to add some breadth to the graduate-level environmental chemistry offerings at WWU.

The instructional format will constitute a mix of lectures, student-led teaching sessions on components of the material, discussions of the primary literature, and occasional excursions into the lab.

Course Schedule

Week 1 (March 31):

Introduction to ocean circulation and consequences for biological production

Weeks 2-4 (April 7 – April 21):

Harmful algal blooms and coastal hypoxia.

Dissolved organic matter inputs; algal blooms, toxicity and food web effects; oxygen depletion and biological consequences.

Unit final project due: **April 21**

Weeks 5-7 (April 28 – May 12)

Riverine inputs and eutrophication.

Macronutrient (N, P, Si) chemistry; metal inputs and speciation; effects of damming; coastal ocean food web changes.

Unit final project due: **May 12**

Weeks 8 – 10 (May 19 – June 2)

Global carbon cycle and the coastal ocean.

Gas exchange; carbon dioxide equilibrium; acidification effects on calcifying marine organisms; organic matter remineralization, deposition and preservation.

Unit final project due: **TBD**

Evaluation Procedures and Grading

The course grade will be based on:

Participation in class discussions and student-led instruction (25%)

Performance on unit final projects (3, each worth 25%)

Unit final projects may include:

- Oral presentations with accompanying informational handout
- Preparation of 'white paper' on one of the environmental issues we discuss
- Hosting a community forum with poster presentations and informational sessions on a topic from the class
- Writing an article interpreting a coastal ocean issue for the public, modeled after those in popular science magazines (i.e. Discover, Scientific American, Science News)

Specific guidelines on each of these assignments will be provided.