

SYLLABUS 270.401

270.401 – Introduction to Physical Oceanography, Spring 2005

Faculty: Professors Osborn and Haine (osborn@jhu.edu, Thomas.Haine@jhu.edu)

TA: To be announced

Target Audience: This class is an introduction to a wide range of physical phenomena in the ocean. In each case, we describe the key attributes then show how fundamental physical principles can explain what's going on. A follow-on class, 270.402 Introduction to Dynamical Oceanography, explores some of these phenomena from a more theoretical perspective.

The course is designed for first year graduate students in oceanography, graduate students in engineering disciplines that will involve ocean processes (Civil, Environmental, and Mechanical Engineering departments), and advanced undergraduates that want to apply their knowledge of physics and mathematics to the ocean.

Prerequisites: Students are to be knowledgeable about calculus through partial differential equations and (at least) freshman physics.

Credit: 3 Units

Texts:

Unfortunately, there is no single satisfactory text for this class, and we do not follow text books closely. Nevertheless, the following books are helpful (roughly in order of importance/relevance):

The Open University: Seawater: Its composition, properties and behavior
 Ocean circulation
 Waves, tides and shallow-water processes

Pickard and Emery: Descriptive Physical Oceanography

Pond and Pickard: Introductory Dynamical Oceanography

Bowditch: American Practical Navigator

Horton: Turning the Tide

Gulland: The Management of Marine Fisheries

Kurlansky: The Cod

Brooks: The Oyster

Format:

The course will be taught as lectures and problem sessions, with lectures the first hour and problems to be worked during the second hour.

Grading:

There will be hour exams and problem sets. The final grade will be determined by an accumulation of those input data.

Turn over for lecture topics...

Schedule:

Feb 3, 4, Week 1:

Introduction.

The global ocean basins.

Physical properties of seawater.

Physical structure of the global ocean.

Feb 10, 11, Week 2:

Light and sound in the ocean.

Charts and navigation.

Feb 17, 18, Week 3:

Ocean surface waves (gravity and capillary).

Feb 24, 25, Week 4:

Tides.

Mar 3, 4, Week 5:

Estuaries and beaches.

Mar 10, 11, Week 6:

Storm surges, seiches, tsunamis.

Mar 17, 18, Week 7:

Spring Break.

Mar 24, 25, Week 8:

Mid term exam.

Shelf and coastal circulation. Upwelling.

Mar 31, Apr 1, Week 9

Air/sea interaction. The ocean mixed layer.

Apr 7, 8, Week 10:

Stratification, internal waves. Seasonal cycle of the thermocline.

Apr 14, 15, Week 10:

Ocean general circulation:

Wind driven ocean circulation.

Apr 21, 22, Week 11:

Ocean general circulation:

Thermohaline circulation and measurement technologies.

Apr 28, 29, Week 12:

Biological productivity, plankton cycles, fisheries management.

May 5, 6, Week 13:

Special topics. Class review