

Prepared by the Department of Natural Sciences and Life Fitness

Date of Departmental Approval: October 7, 2013

Date Approved by Curriculum and Programs: October 23, 2013

Effective: Spring 2014

1. **Course Number:** ENV 126
Course Title: Coastal and Shelf Oceanography
2. **Description:** This course provides an overview to the oceanography of coastal and shelf systems. Throughout the course, the interdisciplinary aspects of oceanography are emphasized by covering many areas of study including biology, chemistry, geology, physics, history, and ecology. Students gain a basic understanding and appreciation of the effects of natural marine processes as well as consequences of human activity. Emphasis is on near-shore, shallow-water systems.
3. **Student Learning Outcomes (instructional objectives, intellectual skills):**
Upon successful completion of this course, students are able to do the following:
 - Outline the history of oceanography and its evolution into a scientific discipline
 - Describe in detail the origin of the earth and oceans
 - Describe the physical and chemical attributes of seawater and how these affect the distribution of coastal properties (e.g. upwelling, coastal currents, stratification)
 - Describe the relationship between atmospheric and oceanic circulation and their analogous patterns
 - Evaluate the processes that shape the coast
 - Describe the flora and fauna of several coastal ecosystems (e.g. coral reefs, seagrass, mangrove)
 - Evaluate the impact of humans on the coastal zone
 - Conduct field studies to monitor the coastal environment
4. **Credits:** 3 credits
5. **Satisfies General Education Requirement:** No
6. **Prerequisites:** (MAT020 or MAT025) or satisfactory basic skills assessment score, ENV118, and ENV125
7. **Semester Offered:** Spring
8. **Suggested General Guidelines for Evaluation:** Students are graded on homework assignments, classroom activities and presentations, and written exams.
9. **General Topical Outline (Optional):**
 - I. Introduction to Coastal Oceanography:
 - A. Origins
 - a. Earth and Ocean
 - b. Life
 - c. Paleoceanography
 - B. History
 - a. Age of Discovery
 - b. Scientific Expeditions
 - c. Modern Oceanography
 - C. Coastal Zones
 - II. Plate Tectonics
 - A. Layered Earth
 - B. Seafloor Spreading
 - C. Plate Boundaries
 - D. Role of Plate Tectonics in Coastal Zone Development
 - III. Sediments
 - A. Classification

- B. Distribution
- C. Historical Records
- D. Sediment Budgets
- IV. Water
 - A. Physical and Chemical Properties
 - B. Distribution of Water Characteristics
 - a. Vertical
 - b. Horizontal
 - c. Coastal Waters
- V. Circulation
 - A. Atmospheric
 - B. Oceanic
 - C. Effects of Coastal Processes
- VI. Waves and Tides
 - A. Wave Anatomy
 - B. Effect OF the Coast
 - C. Effect ON the Coast
- VII. Life in the Ocean
 - A. Diversity
 - B. Marine Communities
 - a. Pelagic
 - b. Benthic
- VII. Unique Coastal / Shallow Water Ecosystems
 - A. Coral Reefs
 - B. Mangroves
 - C. Seagrass
 - D. Salt Marsh
 - E. Estuaries
 - F. Kelp Forests
- VIII. Uses and Abuses of Coastal Systems
 - A. Pollution
 - B. Habitat Degradation
 - C. Over Exploitation
 - D. Resources
 - a. Physical
 - b. Biological

Lab and Field Activities

- Marine Charts and Navigation Lab
- Seawater Properties Lab: Collection and water quality analysis of seawater samples
- Sediment Lab: Comparison of sediment types and sizes from coastal and shelf systems
- Stratification Lab: Collection and analyses of vertical profiles (CTD casts) of physical water parameters
- Circulation Lab: Demonstration of effects of temperature and salinity on density driven circulation
- Plankton Lab: collection and analysis of zooplankton and phytoplankton common to coastal/shelf ecosystems
- Benthic Lab: collection and analysis of benthic organisms
- Field trip to PCCS wave observation field station
- Field trip to either a salt marsh or eelgrass ecosystem
- Field trip aboard PCCS's R/V Shearwater