Prepared by the Department of Natural Sciences and Life Fitness
Date of Departmental Approval: April 7, 2008
Date approved by Curriculum and Programs: September 22, 2008 Effective: Fall 2009

1. Course Number: ENV127
Course Title: Projects in Coastal Ecology

2. Description: This is an advanced class focusing on field studies of coastal marine habitats and their species composition. Students are involved in extensive field and lab surveys of several sites on Cape Cod. They examine both the biological and physical features of the coastal marine environment. Students work in small teams collecting physical (slope, particle size) and chemical data (pH, salinity, nitrates), plant and animal surveys, and recording data to analyze in the classroom.

3. Student Learning Outcomes (instructional objectives; intellectual skills):

Upon successful completion of this course, students are able to do the following:

- Define a field transect of two different marine systems.
- Measure the following physical parameters using the correct instrumentation: salinity, temperature, dissolved oxygen, nitrogen, and turbidity.
- Describe the symbiotic relationships between epiphytes and epifauna and their hosts.
- Identify several species of shorebirds, and describe their behavior.
- Interpret shoreline change based on field observations.
- Record the size of sediments and compare different types of beaches.
- Prepare a herbarium of macroalgae.
- Describe the ecological significance of estuaries, and the factors that affect them.
- Collect plankton samples and estimate the frequency of different species.
- Define field population studies of common intertidal species, such as periwinkles.
- Differentiate between marine coastal habitats such as salt marshes, sandy shores, and mud flats.
- Prepare an inventory of vascular plants on a dune.
- Discuss some of the medical research being conducted using marine organisms.
- Identify the common species of marine mammals and review current research on their behavior and ecology.
- Work with a team to collect and analyze field data.
- Prepare a series of field reports based on original research.
- Analyze the effects of tides, waves, and currents on plant and animal populations.
- Identify the different types of coasts and the beach processes that affect their formation.
- Identify several common fish species and discuss their adaptations to different habitats.

4. Credits: 3 credits

5. Satisfies General Education Requirement: No

6. Prerequisites: ENV118 and ENV125

7. Semester(s) Offered: Fall

8. Suggested General Guidelines for Evaluation: Tests, Lab, Field Reports and Field Projects

9. General Topical Outline (Optional):

ENV127. Projects in Coastal Ecology
Content Outline

I. Review of basic ecological principles
   a. Features of the intertidal zone
   b. Common plant and animal phyla
   c. Symbiosis and zonation

II. Physical and chemical parameters of marine systems
   a. Temperature, salinity, and density
   b. Dissolved oxygen
   c. Nutrients
   d. Turbidity
   e. Tides and Waves
   f. Currents

III. Plankton Communities
   a. Phytoplankton and Zooplankton
   b. Primary productivity
   c. Methods of collecting

IV. Marine Nekton
   a. Fish species and factors affecting growth and distribution
   b. Birds – Shoreline and pelagic
   c. Marine Mammals
   d. Adaptations of nektonic species

V. Intertidal Ecology
   a. Rocky, sandy, and muddy substrates
   b. Benthic communities
   c. Adaptations of organisms
   d. Distribution patterns
   e. Feeding biology
   f. Succession and patchiness
   g. Physical factors

VI. Estuaries and Salt Marshes
   a. Physical characteristics
   b. Estuary biota
   c. Morphological, physiological, and behavioral adaptations
   d. Productivity
   e. Food webs
   f. Composition of salt marshes

VII. Field Studies
   a. Equipment
   b. Transects and quadrats
   c. Field notes and report format
   d. Preparation of herbarium
   e. Population measurements

VIII. Field Sites – Off-Campus locations
   a. Barrier Beach
   b. Salt Marsh