

Prepared by the Department of Natural Sciences & Applied Technologies

Date of Departmental Approval: December 2, 2014

Date Approved by Curriculum and Programs: February 9, 2015

Effective: Fall 2015

1. Course Number: BIO205/BIO205L

Course Title: General Ecology/General Ecology Lab

2. Description: The lecture portion of this course provides an introduction to the fundamentals of ecology including the interactions of populations, communities, and ecosystems. Students will be introduced to the techniques of ecological data gathering and analysis. The laboratory exposes students to the field techniques used in investigating different ecological communities, specifically of Cape Cod, and emphasizes team-based research. One Saturday field trip is required for the laboratory component. (3 class hours/3 laboratory hours per week)

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

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

- Define key terms and relate terminology with ecological concepts.
- Demonstrate how the ecosystem is the basic unit of ecological structure and function
- Identify ecological interactions including population dynamics, cultural challenges, resource utilization and biotic systems.
- Apply the main concepts discussed to contemporary ecological theory.
- Evaluate the strength of research presented in support of the main concepts; including a critique of study design.
- Relate the corresponding laboratory experiments to contemporary ecological theory.
- Use appropriate techniques in the laboratory, collect and analyze meaningful data, and present clearly and cogently written laboratory results (utilizing Standard American English).
- Work cooperatively in a small group setting to complete various laboratory exercises, following the written instructions provided.
- Explain the basic theory and principles of ecology.
- Effectively utilize appropriate quantities and units to describe observations.
- Use a variety of devices and instruments in taking field and laboratory measurements.
- Use a calculator and computer as tools in solving a wide variety of problems
- Use word processing and spreadsheet software to prepare and present laboratory reports and final paper in professional journal format.
- Manipulate, summarize, interpret and present data in the form of graphs and charts.
- Evaluate sources of information from authoritative web sites and articles.
- Examine and evaluate published ecological data in the form of spreadsheets, graphs, and charts.
- Write at least one formal research paper on a pertinent topic in ecology.
- Use online tools to manipulate data.
- Use LMS resources such as a discussion forum and blogs.

4. Credit(s): 4 credits

5. Satisfies General Education Requirement: Natural or Physical Science

6. Prerequisites: ENL101 (English Composition I) and a grade of C or higher in BIO151 (General Biology I) or ENV118 (Introduction to Environmental Science)

7. Semester Offered: Fall

8. Suggested General Guidelines for Evaluation:

- Exams and quizzes
- Research paper on an appropriate topic chosen by the student. Specified format, with graphs, figures, and literature cited.
- Field and laboratory exercises.
- Participation in class and laboratory discussions.

9. General Topical Outline (Optional):
General Outline of Topics to be Covered in Lecture

- I. Introduction
 - A. Biomes
 - 1. Life on Land
 - 2. Life on Water
 - B. Water Cycle
- II. Adaptation to the Environment
 - A. Temperature Relations
 - B. Water Relations
 - C. Primary Productivity and Energy Flow
 - D. Nutrient Cycling
- III. Population Ecology
 - A. Population Genetics and Natural Selection
 - B. Population Distribution and Abundance
 - C. Population Dynamics
 - D. Population Growth
- IV. Interactions
 - A. Life Histories
 - B. Competition
 - C. Exploitative Interactions
 - D. Mutualism
- V. Communities and Ecosystems
 - A. Species Abundance and Diversity
 - B. Species Interactions and Community Structure
 - C. Succession and Stability
- VI. Large Scale Ecology
 - A. Landscape Ecology
 - B. Geographic Ecology
 - C. Global Ecology

General Outline of Topics to be Covered in Laboratory

- I. Introduction to Statistics and Data Analysis
- II. Terrestrial Macroinvertebrates Field Study
- III. Intertidal Zonation
- IV. Plankton Diversity Field Study
- V. Introduction to Scientific Writing
- VI. Intertidal Zonation Data Analysis
- VII. Tree Competition Field Study