NORTHWESTERN CONNECTICUT COMMUNITY COLLEGE
COURSE SYLLABUS

Course Title: GENERAL ECOLOGY **Course #:** BIO* 178
Course Description: 4 semester hours (3 class hours/3 laboratory hours).

Lecture: An introduction to the basic principles of ecology and application of these principles to conservation and environmental problems. Computer skills, including email, word processing, and web navigation **are critical** for this course. . Field trips are required.

Lab: Lab section to accompany BIO* 178 lecture to introduce students to a field and laboratory study of ecology. Ecology is the study of interactions among organisms, and between organisms and their physical environment. We will investigate basic ecological theories through laboratory exercises conducted both in class and in the field. Topics that may be covered could include: population growth, competition, species interaction, habitat description, animal behavior and community analysis. Part of the laboratory exercises will focus on environmental issues and the measurement of environmental data.

Pre-requisite/Co-requisite: Eligibility for, or completion of, ENG* 101.

Goals (Lecture): To provide the student with a basic understanding of ecological principles including: the constant change of the Earth over geologic time, concepts of adaptation, natural selection, and evolution, definitions of species and speciation, interactions of living organisms and the physical environment, inter- and intraspecific relationships, changes in ecological communities over time. In addition, students will be exposed to concepts of ecology as they relate to current major environmental problems.

Goals (Lab): To provide students with projects and activities to reinforce basic ecological principles including: population and community dynamics, abiotic and biotic interactions, and nutrient cycling; to develop proficiency with modern sampling tools and techniques; to identify the major biomes, as well as the micro- and macroecosystems of Connecticut. The general objectives of Bio 171L are to: (1) Utilize basic ecological sampling techniques via hands-on examples and field projects and (2) Apply the principles and concepts of ecology to data collected from the field.

Outcomes (Lecture): At the end of the course, students should be able to:

1. Define and discuss the scientific method
2. Define ecology, ecosystem, community, and population
3. Compare and contrast ecology to the other biological, chemical, and physical sciences
4. Explain the relationships among adaptation, natural selection, and evolution
5. Examine the sources of genetic variation within a population
6. Analyze how abiotic components of an ecosystem affect the biotic components
7. Compare and contrast animal and plant adaptations to the environment
8. Define decomposition and discuss the variety of processes involved
9. Summarize the types of population distribution
10. Explain the factors of population growth and examine the various reasons why populations go extinct
11. Compare and contrast various forces of intraspecific population regulation
12. Distinguish between the payouts, tradeoffs, and consequences of both sexual and asexual reproduction
13. Analyze the various types of species interactions that occur within communities
14. Explain succession
15. Compare and contrast various forces of interspecific competition
16. Define predation and distinguish among its forms
17. Describe the various types of parasitism
18. Compare and contrast the various processes that shape communities
19. Discuss the concept and application of sustainable yield to the exploitation of natural populations
20. Describe the concept of the ecosystem including thermodynamics and productivity

21. Identify the major biogeochemical cycles and describe sources and sinks of each
22. Compare and contrast the major biomes of New England and the Earth as a whole
23. Identify, analyze, and discuss the major causes of global environmental change and their impacts on life

Outcomes (Lab): At the end of this laboratory course component, the student will be able to:

1. Explain the importance of field, laboratory, and microcosm experimentation in ecology
2. Describe the importance and history of interpretive natural history in ecology
3. Use modern techniques of GIS and GPS to assist in data collection and analysis
4. Properly carry out soil, air, water quality, dissolved gas/nutrients, and weather sampling/analysis
5. Properly carry out population and community structure sampling and analysis, both quantitatively and qualitatively
6. Compute simple statistical analyses of data sets from the field
7. Identify experimental error and suggest solutions
8. Interpret and draw appropriate conclusions from the analysis of data sets from the field