NORTHWESTERN CONNECTICUT COMMUNITY COLLEGE
COURSE SYLLABUS

Course Title: ECOLOGY **Course #:** BIO* 270
Course Description: 4 semester hours (3 class hours/3 laboratory hours).
Lecture: For science majors. An appreciation for ecological principles is developed through lecture and laboratory exercises. Primary literature is used to explore energy flow and biogeochemical cycling, as well as the many facets of population and community dynamics. All are explored further in the field and in the lecture. Other topics include the ecosystems and the physical constraints on life, biodiversity, genetics and genetic drift, speciation, community energetics, conservation biology, and local/global ecological issues. Emphasis is on primary literature, problem-solving, and exposure to ecological research techniques. Field trips to outdoor laboratory sites are required. Using common ecological methods, laboratory exercises will be conducted in the field that accompany the topics covered in lecture. Applied statistics will be utilized by students to analyze the class data. Topics that may be covered will include: physical constraints, population dynamics, competition, species interactions, habitat classification, community structure analysis, animal behavior, and conservation biology. The use of computers and Blackboard are integral aspects of the course. Computer skills, including email, word processing, and web navigation **are critical** for this course. Field trips are required.

Lab: Lab section to accompany BIO* 270 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 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: ENG* 101 or ENG* 101W AND MAT* 167 AND BIO* 121, all with a "C" or better.

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 270L are to: (1) Utilize 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. Model the scientific method
2. Describe ecology, ecosystem, community, and population
3. Relate ecology to the other biological, chemical, and physical sciences
4. Analyze the relationships among adaptation, natural selection, and evolution
5. Assess the sources of genetic variation within a population
6. Explain how abiotic components of an ecosystem affect the biotic components
7. Examine animal and plant adaptations to the environment
8. Model decomposition and illustrate the variety of processes involved
9. Identify the types of population distribution
10. Identify the factors of population growth and predict the various reasons why populations go extinct
11. Explain various forces of intraspecific population regulation

12. Compare and contrast between the payouts, tradeoffs, and consequences of both sexual and asexual reproduction
13. Model the various types of species interactions that occur within communities
14. Diagram succession
15. Evaluate various forces of interspecific competition
16. Differentiate predation and its varied forms
17. Distinguish between the various types of parasitism
18. Evaluate the various processes that shape communities
19. Examine the concept and application of sustainable yield to the exploitation of natural populations
20. Explain the concept of the ecosystem including thermodynamics and productivity
21. Discuss the major biogeochemical cycles and describe sources and sinks of each
22. Model the major biomes of New England and the Earth as a whole
23. Assess 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. Discriminate between field, laboratory, and microcosm experimentation in ecology
2. Examine the importance and history of interpretive natural history in ecology
3. Employ 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. Complete statistical analyses of data sets from the field
7. Judge experimental error and suggest solutions
8. Interpret and draw appropriate conclusions from the analysis of data sets from the field