South Central College

BIOL 215 General Ecology

Course Outcome Summary

Course Information

Description This course examines interrelationships between organisms and their environment, with an emphasis on population, community and ecosystem dynamics. Ecological research methods are applied through hands-on activities in lab and in the field. While basic ecology is the focus, relationships between ecological research and current environmental issues will also be addressed. This course includes outdoor data collection and off-campus field trips. MNTC Goal Areas 3 and 10. (Prerequisites: BIOL 116).

Total Credits 4

Total Hours 96

Types of Instruction

Instruction Type	Credits/Hours
Lecture	3/48
Lab	1/48

Pre/Corequisites

BIOL 116

Institutional Core Competencies

Communication - Students will be able to demonstrate appropriate and effective interactions with others to achieve their personal, academic, and professional objectives.

Critical and Creative Thinking - Students will be able to demonstrate purposeful thinking with the goal of using a creative process for developing and building upon ideas and/or the goal of using a critical process for the analyzing and evaluating of ideas.

Course Competencies

1. Explain the parameters of science and scientific inquiry

Learning Objectives

Identify the steps employed in scientific methodologies
Describe the scope of scientific inquiry
Explain the role of science in society

2. Engage in the process of scientific inquiry to conduct ecological research

Learning Objectives

Formulate and test hypotheses
Collect and analyze data
Interpret data and form conclusions
Apply quantitative tools (models, simulations and statistical tests) to the assessment of ecosystems, communities and populations
Communicate experimental findings in formal scientific writing

3. Incorporate information from primary literature into writing

Learning Objectives

Assess the reliability of sources of scientific information
Investigate ecological research in primary literature
Apply information from primary literature to current environmental issues
Communicate information from primary literature in formal scientific writing

4. Describe the conceptual foundations and scope of ecology

Learning Objectives

Define ecology and identify the levels of ecological hierarchy
Describe the contributions of observational, theoretical, laboratory and field data to the field of ecology
Identify important figures and events in the history of ecology
Integrate ecological concepts in the analysis of environmental issues
Describe the relationship between ecology and human society (e.g., conservation, agriculture, hunting, fishing, spirituality)
Explain the value to human society of ecological modeling, monitoring and restoration

5. Examine the relationship between ecology and evolution

Learning Objectives

Identify several factors that contribute to the process of evolution
Differentiate between evolution and natural selection
Illustrate the process of natural selection
Explain the roles of genetics and the environment in the process of natural selection

6. Differentiate between various terrestrial biomes

Learning Objectives

Assess several factors for why the biosphere is patchy
Explain the influence of climate and other factors on delineating biomes
Describe the key features of the different biomes
Analyze adaptations of organisms occupying each biome

7. Describe the key properties of ecosystems

Learning Objectives

Define ecosystem
Differentiate between abiotic and biotic factors
Describe the ecological relationships occurring at the ecosystem level
Identify several ecosystem services

8. Describe the flow and transformation of energy through ecosystems

Learning Objectives

Identify the main forms of energy in ecosystems
Describe how energy is transformed through an ecosystem
Apply the laws of thermodynamics to ecosystem energy
Explain how energy flow applies to trophic structure

9. Illustrate pathways of nutrient cycling in an ecosystem

Learning Objectives

Identify the main types and forms of nutrients that cycle through an ecosystem

Explain the importance of the main types of nutrients in an ecosystem
Identify the main reservoirs for which nutrients cycle
Describe how specific nutrients are transported from one reservoir to another
Evaluate how human activity has influenced various nutrient cycles

10. Describe the key properties of communities

Learning Objectives

Define community
Describe the influence of environmental complexity (e.g., vegetative structure) on communities
Explain the relationship between diversity and community stability
Outline the structure of food webs and trophic relationships between organisms
Explain the role of ecological disturbances on ecological succession

11. Examine biodiversity and the implications of biodiversity loss

Learning Objectives

Define biodiversity and describe its various levels
Explain the roles of richness and abundance in determining species diversity
Explain the importance of biodiversity
Describe several causes of biodiversity loss
Assess strategies for preserving biodiversity

12. Analyze the different types of interspecies interactions

Learning Objectives

Describe factors that affect the outcome of competition
Assess various adaptations of predator and prey populations
Identify various forms of symbiosis
Provide examples of tripartite relationships

13. Describe the ecological niche concept

Learning Objectives

Define ecological niche
Differentiate between fundamental niche and realized niche
Compare and contrast different types of species based on niche
Describe the influence of keystone species and foundation species on communities
Describe the influence of introduced species on communities

14. Describe the key properties of populations

Learning Objectives

Identify different types of intraspecific interactions
Compare and contrast patterns of population distribution
Interpret population growth models
Define carrying capacity and identify several limits to population growth
Explain the use of life tables and survivorship curves to describing populations
Interpret age structure diagrams and explain their importance in predicting future population growth

15. Assess the impact of human activity on communities and ecosystems

Learning Objectives

Explain how various land-use activities affect stream and lake watersheds
Apply water sampling techniques to assessing the health of a stream and lake
Apply forestry techniques to assessing the structure and health of a woodland
Analyze the structure and growth of local populations
Evaluate the influence of climate change on communities and ecosystems

16. Demonstrate safe laboratory practices

Learning Objectives

Be aware of any hazardous materials used during lab experiments
Handle chemicals and lab equipment in a safe manner

SCC Accessibility Statement

South Central College strives to make all learning experiences as accessible as possible. If you have a disability and need accommodations for access to this class, contact the Academic Support Center to request and discuss accommodations. North Mankato: Room B-132, (507) 389-7222; Faribault: Room A-116, (507) 332-5847.

Additional information and forms can be found at: www.southcentral.edu/disability

This material can be made available in alternative formats by contacting the Academic Support Center at 507-389-7222.