

SOUTHEAST COMMUNITY COLLEGE
DIVISION OF ARTS AND SCIENCES
Sciences
Revision Date: 07-01-19

I. CATALOG DESCRIPTION

Course Number: BIOS 2200
Course Title: Principles of Ecology
Prerequisite(s): BIOS1010 or BIOS1410
Catalog Description: Ecology is the study of the interactions between organisms and their environment. This course will investigate relationships between living things and both the biotic and abiotic components of their environments at the organismal, population, community, and ecosystem levels. A background in the fundamental principles of ecological science, natural selection, biodiversity, and environmental sustainability will be covered. Current practices in ecological research as well as current ecological issues will also be discussed as part of the course's core material. The laboratory component will concentrate on standard practical applications in ecological research and dataset analysis. Must be enrolled in BIOS2200L concurrently.

Credit Hours: 4.0
Class Hours: 45.0
Lab Hours: 30.0
Total Contact Hours: 75.0

II. COURSE OBJECTIVES: *Course will:*

- A.** Investigate the relationship between living things and their environments
- B.** Study how organisms interact at the population, community, and ecosystem levels.
- C.** Discuss the relationships between natural selection and biodiversity.
- D.** Review current practices in ecological research.
- E.** Discuss the concept of environmental sustainability using current ecological issues as case studies.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES

- A.** Student Learning Outcomes: *Student will be able to:*
 - 1.** Define ecology
 - 2.** Understand that all events in the natural world are interconnected
 - 3.** Define the physical, or nonliving components of ecosystems
 - 4.** Understand how physical features of an environment can affect organisms
 - 5.** Predict how organisms cope with fluctuations in environmental conditions both in the short term and long term
 - 6.** Explain how evolution and ecology interconnected
 - 7.** Understand various life history strategies and how environmental conditions affect them
 - 8.** Understand how behavior can lead to testable predictions in how organisms make life history choices
 - 9.** Determine how populations are distributed, how they grow and are regulated, and the factors that fluctuations
 - 10.** Identify the various ways organisms interact and how those interactions shape natural communities
 - 11.** Understand the structure and distribution of natural communities

12. Describe energy flow, nutrient cycling, and primary production within and between ecosystems
 13. Understand the role of ecology in applications of conservation and management of ecosystems and landscapes at multiple scales
- B. General Education Learning Outcomes**
1. GELO #3: Critical Thinking & Problem Solving
 Outcome: Collect, identify, interpret and analyze data.
 Outcome: Synthesize information to arrive at reasoned solutions to problems.
 Outcome: Evaluate ideas presented in writing, media, speech, or artistic presentations.
 Outcome: Evaluate the validity of arguments, alternatives, data, outcomes, and/or impacts of actions.
 Outcome: Acquire and integrate knowledge and construct relationships across disciplines.
 2. GELO #5: Analytical, Quantitative, and Scientific Reasoning
 Outcome: Apply mathematical and scientific methods to solve problems from an array of contexts and everyday situations.
 Outcome: Understand and create logical arguments supported by quantitative and scientific evidence and communicate those arguments in a variety of formats.
 Outcome: Effectively develop strategies, algorithms, or experiments (or performing experiments) to better describe the systems or to solve the problems.
 Outcome: Manipulate formulas, data sets, graphs, tables, etc. in a way to produce a meaningful outcome.
 3. GELO #6: Career and Life Skills
 Outcome: Use digital technology effectively to access, manage, integrate, evaluate, and present information.

IV. CONTENT/TOPICAL OUTLINE (*course outline may provide more detailed information*)

- A. Organisms and their environment**
 1. The physical environment
 2. The Biosphere
 3. Coping with environmental variation
- B. Evolutionary Ecology**
 1. Evolution and ecology
 2. Life history
 3. Behavioral ecology
- C. Populations**
 1. Population distribution and abundance
 2. Population growth and regulation
 3. Population dynamics
- D. Interactions Among Organisms**
 1. Competition
 2. Predation and Herbivory
 3. Parasitism
 4. Mutualism and Commensalism
- E. Communities**
 1. Community structure
 2. Community dynamics
 3. Biogeography
 4. Biodiversity in communities
- F. Ecosystems**
 1. Gross and net primary production

2. Energy flow and trophic levels
3. Nutrients and nutrient cycling
- G. Ecological Applications
 1. Conservation biology
 2. Landscape ecology
 3. Ecosystem management
 4. Global ecology

V. INSTRUCTIONAL MATERIALS

- A. Required Text(s):
 1. Molles. *Ecology Concepts and Applications*. McGraw-Hill. 7th ed. 2015. ISBN-13: 9781259421747.
- B. Other Resources:
 1. Handouts from scientific journals, laboratory exercises, case studies, and ecological essays.

VI. METHODS OF PRESENTATION/INSTRUCTION

- A. Methods of presentation typically include a combination of the following:
 1. Lecture using PowerPoint slides or other forms of visual aids
 2. Instructor may assign a reading with questions for discussion by the entire class
 3. Videos may be used to supplement lecture material
 4. Web-based interactive assignments either developed by the instructor or pre-packaged by the textbook publisher.

VII. METHODS OF EVALUATION

- A. Methods of evaluation typically include a combination of the following:
 1. Exams, to include multiple choice, true/false, matching, short answer, and essay-type questions
 2. Students may be asked to present either an individual or a group-based project or discussion based on case studies and real-world ecological applications
 3. Laboratory evaluations will be based on successful completion of experiments and/or data acquisition and analysis projects
- B. SCC GRADING SCALE

A+	95-100	C+	75-79	F	59 or less
A	90-94	C	70-74		
B+	85-89	D+	65-69		
B	80-84	D	60-64		

VIII. SPECIFIC COURSE REQUIREMENTS:

- A. Several laboratory activities will be conducted outside in natural environments either on or near the campus. Appropriate dress will be required.
- B. Field trips off campus may require more time than the scheduled laboratory time.