Organismal Biology, Ecology and Evolution

|  |  |
| --- | --- |
| **C-ID Number** | BIOL 130 S |
| **Discipline** | Biology |
| **Date Approved** | December 15, 2012 |

## General Course Description

This course sequence, intended for majors, includes a survey of the biology and diversity of organisms and examines the basic principles governing evolution of organisms and interactions between organisms and the environment. The course sequence emphasizes classification, structure and function of organisms, ecological principles, and mechanisms of evolution.

## Minimum Units

8.0

## Any rationale or comments

This descriptor is a sequence composed of at least two courses with a total minimum of 6.0 units of lecture and 2.0 units of lab covering the course content below. All courses used to meet this sequence are recommended to be taken at the same institution.

## Advisories/Recommendations

Completed C-ID BIOL 190 (Cell and Molecular Biology); eligible for English Composition (C-ID ENGL 100)

## Course Content

More than one combination of courses may fulfill these requirements; but each combination must include all of the following:
Overview of tree of life
Phylogeny/Evolutionary History of major taxa
Systematics and Taxonomy:  Classification schemes
Prokaryotes
Protists
Fungi
Survey of animal phyla
Survey of plant phyla
Animal Systems Structure:  Anatomy
Animal Systems Function:  Physiology
Plant systems structure: anatomy
Plant systems function: physiology
Animal Development and life cycles
Plant development and life cycles
Population Ecology
Population structure, growth, regulation, and fluctuation
Intraspecific interactions
Social systems and behavior
Community Ecology
Interspecific interactions:  Predator-prey relations, competition, symbiosis
Community structure and succession
Ecosystem diversity (Biomes)
Ecosystems ecology:
    Trophic structure
Energy flow
Nutrient cycling and ecosystem integrity
Conservation biology
Mechanisms of Evolutionary change:  Natural Selection, Genetic Drift,
       Gene Flow, and Mutation, and Nonrandom Mating
Population genetics
Speciation and Extinction

## Laboratory Activities

The laboratory component must include greater than 80% hands-on activities that support the learning goals of the course. Laboratory content must be considered when matching courses to this descriptor.
Typical laboratory content includes:
Use of experiments to explore course topics.
Appropriate statistical analysis of data.
Population growth modeling.
Measures of species diversity and richness.
Mechanisms of evolution.
And the following for representative organisms in phyla from both animals and plants:
A. Microscopic and gross comparative anatomy, including dissection.
B. Comparative study of functional morphology.
C. Comparative study of physiology.
D. Comparative study of developmental stages and life cycles.
Typical laboratory activities may also include: Simulations, exploratory activities in systematics, collection and analysis of population data, field observations, field sampling methods, field trips, and projects.

## Course Objectives

Apply the processes of scientific inquiry including experimental design.
Carry out an experiment to test a specific hypothesis using appropriate controls.
Explain the essential elements of life, major hypotheses for life’s history, mechanisms for the diversification of life, and macroevolution.
Apply the tools of evolutionary biology to the analysis and evaluation of historical relationships among organisms.
Describe mechanisms of evolutionary change including micro-evolutionary forces that determine patterns of genetic diversity within species.
Provide evidence for evolution.
Evaluate the ecological relationships of organisms at the population, community, and ecosystem level.
Describe flow of energy within an ecosystem and the role of nutrient cycling in maintaining ecosystem integrity.
Explain fundamental prokaryotic replication, metabolism, and cellular structure in relationship to evolution of diversity.
Compare and contrast differences in animal development and life cycles.
Compare and contrast differences in plant development and life cycles.
Describe how plants and animals maintain homeostasis: water and ion balance, gas exchange, energy and nutrient acquisition, temperature regulation.
For major taxa of protists, fungi, plants and animals,
Identify major groups and arrange them within currently recognized taxa.
Compare and evaluate different phylogenies in terms of relationships amongst taxa.
Describe structural organization/morphology.
Identify and describe structures and relate them to their functions.
Classify individual representative specimens to phylum.

## Prerequisites

Eligible for college level math (C-ID MATH 110, 120, 130, 140, 150, 151 OR any other course with Intermediate Algebra as a prerequisite)

## Corequisites

None

## Methods of Evaluation

A variety of assessment techniques including examinations, projects, papers, laboratory reports, and laboratory practicals.

## Sample Textbooks

A current (pursuant to C-ID policy) college level textbook and laboratory manual supporting the learning objectives of this course, and designed for majors, must be considered when matching courses to this descriptor. For example, Campbell, Raven, Mader.

## Notes