C-ID Descriptor
Biology Sequence for Majors

Descriptor Details

- **Descriptor Title**: Biology Sequence for Majors
- **C-ID Number**: 135
- **Suffix**:
  - Sequence (S)
- **Units**: 8.0
- **Date of Last Revision**: 10/12/2017 04:44:12 PM PDT

General Description

This course sequence, intended for majors, covers principles and applications of prokaryotic and eukaryotic cell structure and function, biological molecules, homeostasis, cell reproduction and its controls, molecular genetics, classical/Mendelian genetics, cell metabolism including photosynthesis and respiration, and cellular communication. It 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. The philosophy of science, methods of scientific inquiry and experimental design are foundational.

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

Advisories

Eligible for English Composition (C-ID ENGL 100)

Content

No information provided

Lab Activities

Laboratory content must be considered when matching courses to this descriptor.

Laboratory includes experimental design, data analysis, and techniques used to address questions in the field.

The laboratory component must include greater than 80% hands-on activities that support the learning goals of the course.

Typical laboratory content includes:

Identify and describe biological molecules and cell structures and explain their functions.
Compare and contrast cellular processes and interactions between prokaryotes and eukaryotes (including metabolism, reproduction, communication).
Apply the principles of classical and molecular genetics to solve problems in genetics or biotechnology.
Relate evolutionary processes to the origin and evolution of cells.
Explain how DNA replicates and transmits genetic information within organisms.
Apply the processes of scientific inquiry and experimental design to the study of biological concepts.
Acquire, read, evaluate, apply and cite scientific literature
Practice scientific writing.
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.

Objectives

1. **Course objectives (BIOL 130S)**:
    1. Apply the processes of scientific inquiry including experimental design.
    2. Carry out an experiment to test a specific hypothesis using appropriate controls.
    3. Explain the essential elements of life, major hypotheses for life's history, mechanisms for the diversification of life, and macroevolution.
    4. Apply the tools of evolutionary biology to the analysis and evaluation of historical relationships among organisms.
    5. Describe mechanisms of evolutionary change including micro-evolutionary forces that determine patterns of genetic diversity within species.
    6. Provide evidence for evolution.
    7. Evaluate the ecological relationships of organisms at the population, community, and ecosystem level.
    8. Describe flow of energy within an ecosystem and the role of nutrient cycling in maintaining ecosystem integrity.
    9. Explain fundamental prokaryotic replication, metabolism, and cellular structure in relationship to evolution of diversity.
    10. Compare and contrast differences in animal development and life cycles.
    11. Compare and contrast differences in plant development and life cycles.
    12. Describe how plants and animals maintain homeostasis: water and ion balance, gas exchange, energy and nutrient acquisition, temperature regulation.
    13. For major taxa of protists, fungi, plants and animals,
    14. Identify major groups and arrange them within currently recognized taxa.
    15. Compare and evaluate different phylogenies in terms of relationships amongst taxa.
    16. Describe structural organization/morphology.

17. Identify and describe structures and relate them to their functions.
18. Classify individual representative specimens to phylum.

2. **Course objectives (BIOL 190)**:
    1. Identify and describe biological molecules and cell structures and explain their functions
    2. Compare and contrast cellular processes and interactions between prokaryotes and eukaryotes (including metabolism, reproduction, communication)
    3. Apply the principles of classical and molecular genetics to solve problems in genetics or biotechnology.
    4. Relate evolutionary processes to the origin and evolution of cells.
    5. Explain how DNA replicates and transmits genetic information within organisms.
    6. Apply the processes of scientific inquiry and experimental design to the study of biological concepts.
    7. Acquire, read, evaluate, apply and cite scientific literature
    8. Practice scientific writing

Evaluation Methods

A variety of assessment techniques that may include examinations, term papers, projects, homework problems, and laboratory practicals, and laboratory reports. There should be a writing component.

Textbooks

A current 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.