C-ID Descriptor
Botany / Plant Diversity and Ecology

Descriptor Details

- **Descriptor Title**: Botany / Plant Diversity and Ecology
- **C-ID Number**: 155
- **Units**: 4.0
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General Description

This course is intended for majors and covers comparative diversity, structure, and function of plant, fungal, and protistan phyla. Topics include development, morphology and physiology, taxonomy and systematics. Principles of population and community ecology and ecosystem interactions are emphasized.

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

No information provided

Advisories

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

Content

Overview of the tree of life, and position of plant, fungal, and photosynthetic protistan taxa
Plant systems structure: anatomy (cell, tissue, organ)
Plant systems functions: physiology (including C3, C4 and CAM photosynthesis)
Plant development, hormones, regulation, reproduction and life cycles
Systematics and Taxonomy: classification schemes and plant speciation
Phylogeny/Evolutionary History of plant, fungal and photosynthetic protistan taxa
Introduction to Ecosystems, Population and Community Ecology
Population Ecology
    Population structure, growth, regulation, and fluctuation
    Intraspecific interactions
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 and human interactions

Lab 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.
Application of the scientific method and hypothesis testing; experimental design.
Microscopic and comparative anatomy for representative organisms from plant, fungal, and photosynthetic protistan phyla.Comparative study of functional morphology for representative organisms from plant, fungal, and photosynthetic protistan phyla.
Comparative study of physiology for representative organisms from plant, fungal, and photosynthetic protistan phyla.
Comparative study of developmental stages and life cycles for representative organisms from plant, fungal, and photosynthetic protistan phyla.

Mechanisms of evolution.
Classification schemes and use of classification tools.
Measures of species diversity and richness.
Appropriate statistical analysis of data.
Population growth modeling.

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

At the conclusion of this course, the student should be able to:

1. Recognize characteristics of plants, fungi, and photosynthetic protistans, and their phylogenetic relationships.
2. Construct and interpret phylogenies.
3. Describe and contrast life cycles within and among major plant, fungal, and photosynthetic protistan taxa.
4. Describe the structural organization of major plant, fungal, and photosynthetic protistan taxa.
5. Identify and describe plant structures and relate them to their functions, including transpiration, photosynthetic pathways, and energy and nutrient acquisition.
6. Describe how organisms are organized into and interact within and among populations and communities.
7. Describe the processes that occur within ecosystems including flow of energy, and the role of nutrient cycling in maintaining ecosystem integrity.
8. Provide evidence for evolution in plants and photosynthetic protistans.
9. Acquire, use and cite of scientific literature for scientific writing.
10. Apply scientific methodology and reasoning through active experimentation and experiences.
11. Demonstrate critical thinking and scientific reasoning skills.

Evaluation Methods

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

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. Example texts with appropriate level of coverage include Campbell, et al. Biology, Sadava et al. Life: The Science of Biology and Freeman, Biological Science, Raven et al. Biology of Plants, Stern's Introduction to Plant Biology.