CLFS 660: Biodiversity and Conservation Biology

Syllabus

CLFS 660: Biodiversity, or the variety and variation among living organisms and the ecological complexes in which they occur, is key to the sustained existence of life. Yet, worldwide trends show that biodiversity is diminishing at an unprecedented rate. Because of habitat exploitation, introduction of invasive species, and environmental pollution, the earth may be losing dozens of species daily. Equally alarming is the loss of genetic variation within natural populations and the increasing reliance on genetically narrow agricultural crops. The course will set forth the concept of biodiversity, explain its complexity and functions, explore how its disappearance threatens all of us, and examine strategies and methods for its conservation.

Instructor: Dr. Dale Bottrell

Required Textbook

Teaching Methods:
Challenge Questions – A Challenge Question, aimed at provoking class-wide discussions of key topics in biodiversity and conservation biology, will be assigned each of the first 10 weeks. Every student is expected to post a primary response to each question (within 5 days) and a secondary response to one or more of the other students’ primary responses (within 7 days). The instructor will evaluate the student contributions and post a summary critique of the class response to each question.

Team Assignments – Students will pursue three assignments in small teams that the students choose themselves. Members of a team will stay together all semester. The team assignments require students to make an in-depth analysis of topics in biodiversity and conservation biology. Examples of team assignment topics pursued in past semesters are “genetic and ecological factors constraining the success of small populations,” “problems with invasive species,” and “the potential of and limitation to different conservation strategies and methods – such as biodiversity preserves, captive breeding, and wildlife corridors.”

Teacher Innovation Project – Each student, or a team of students that the students choose themselves, will develop a Teacher Innovation Project (TIP) on an endangered species of choice. The TIP will require students to innovate a pedagogical approach that challenges their own students to understand endangerment and the difficulty in restoring endangered species to viable population levels.
Examination – Students will take one online examination (during the last week of the semester) on assigned textbook readings and content in the WebCT course site. To be completed online in WebCT, the exam will consist of 20 questions (@ 1 point per question) that require short-essay responses. To prepare, students will be able to take a practice exam before taking the actual exam.

Grading:
- Challenge Questions (10 @ 2 points each) = 20 points
- Team Assignments (3 @ 10 points each) = 30 points
- Teacher Innovation Project = 30 points
- Examination = 20 points
- Total Possible = 100 points

Course Web Site:
The WebCT web site, consisting of twelve Modules, forms the core of the course's technical content. The Objectives and Assignments page opening each module assigns textbook readings and identifies relevant Internet web sites.

Unit One: Concepts and Characteristics of Biodiversity
Unit One modules set forth the concept of biodiversity, compare historical and current rates of species extinction, and show how genetic diversity may change between generations and within and among populations of a species. Then, they examine the complexity and functions of ecosystems and identify which ecosystem features may and may not be predictable. Finally, they explore how biodiversity benefits our lives and how its loss threatens all of us.

- Module 1 - Introduction to Biodiversity
- Module 2 - What Has Happened to the Species List since Linnaeus?
- Module 3 - Genetic Diversity
- Module 4 - Ecosystem Function
- Module 5 - Why Preserve Biodiversity?

Unit Two: Causes and Consequences of Biodiversity Loss
Modules of Unit Two address the major threats to biodiversity. The biggest threat is from habitat loss and alteration followed by the introduction of exotic species that become invasive. Chemical alteration of the environment also has a major impact on both natural and managed ecosystems. In addition, modern plant breeding has seriously eroded the genetic base of our major food crops and in some cases increased their vulnerability to environmental stresses such as diseases.

- Module 6 - Habitat Loss and Alteration
- Module 7 - Exotic Species
- Module 8 - Chemical Pollutants
- Module 9 - Loss of Genetic Diversity in Crops

Unit Three: Deriving Solutions
Unit Three modules examine the concepts, benefits, and limitations of the different strategies for conserving biodiversity. The modules show that conservation actions such as captive breeding, conservation of genetic diversity, ecotourism, and sustainable agriculture have helped to restore biodiversity in many areas. Some of the efforts have resulted in new laws and enforcement
procedures. Some have evolved from grassroots action programs with environmental organizations and local communities joining forces to innovate solutions.

- Module 10 - Conservation Strategies
- Module 11 - Laws and Legal Actions
- Module 12 - Grassroots Action Programs