BIOL 111
Evolution and Ecology
4 Credits: (3 lecture hours; 3 laboratory hours)

Community College of Baltimore County
Common Course Outline

Description

Biology 111 – Evolution and Ecology: is a course that emphasizes whole organisms and the ways in which they evolve and interact to create the dynamics of populations and ecosystems. Topics include evolution, animal reproduction and development, and ecology.

Pre-requisites: BIOL 110 with a "C" or better and MATH 083

Overall Course Objectives

Upon completion of this course, students will be able to:

1. apply scientific methodology in the laboratory by using controls, metric system measuring, and scientifically acceptable data recording with tables and graphs;
2. explain the evidence for evolution by natural selection including Charles Darwin's contribution to the Theory of Evolution and Modern Synthesis;
3. summarize biotic and abiotic factors that control genetic variation at the population level;
4. determine if a species is evolving or is in genetic equilibrium using the Hardy-Weinberg equation;
5. recognize how isolating mechanisms can give rise to new species;
6. relate the developmental stages and structures of an embryo to the organism's evolutionary history;
7. describe the energy flow through an ecosystem and how the major biochemical cycles in the ecosystems can be impacted when humans disturb the equilibrium of these cycles;
8. describe the relationship between disturbance and succession;
9. recognize biomes as extensions of ecosystems;
10. model population growth mathematically via spreadsheets using the exponential and logistic growth models;
11. find, evaluate, use, and cite appropriate scientific literature for use in scientific writing;
12. identify types of animal behavior using an evolutionary context;
13. discuss modern interpretations of the diversity of life, how it evolves and its interdependence with the environment;
14. summarize scientific data orally or in writing;
15. predict patterns of growth and survivorship using life history traits;
16. interpret evolutionary relationships using phylogenetic trees; and
17. recognize the biological similarities and differences between the major kingdoms of life.

Major Topics

I. Darwinian Evolution and the Modern Synthesis
II. Microevolution: the genetics of populations
III. Macroevolution: the evolution of species
    a. Systematics
    b. Phylogenetics
IV. Developmental Biology: the development of organisms at the cellular level
    a. Cellular development
    b. Embryonic development
V. Evolutionary Developmental Biology
    a. Shared evolutionary history
VI. Community Ecology
    a. Intraspecific relationships
    b. Interspecific relationships
VII. Ecosystems
    a. Productivity
    b. Biogeochemical cycles
    c. Biotic and abiotic components
VIII. Biodiversity in the context of evolution and ecology
IX. Animal Behavior and Natural Selection

Course Requirements

Grading will be determined by the individual faculty member, but shall include the following, at minimum:

- Students must earn at least 60% in both lecture and lab to pass the course. Failure in either the lecture or the lab is an automatic F for the course.
- Grades earned in lecture will count 70-80% of the total course grade with the rest of the grade coming from lab.
- Lecture Assessment includes:
    - three unit lecture exams and a cumulative final
    - a combination of three activities which may include article summaries, problem sets and/or oral presentations
- Lab Assessment includes:
    - One formal lab report (15%)
    - Two of the following: (30%)
        - Weekly lab reports
        - Four lab assignments
        - Two lab practical exams
        - Four quizzes

Written assignments and research projects: Students are required to use appropriate academic resources in their research and cite sources according to the style selected by their professor.

Other Course Information

This course is an approved 4–credit General Education course in the Biological and Physical Sciences and fulfills the laboratory requirement.

One or more assignments will infuse CCBC General Education Program outcomes and will account for a minimum of 10% of the total course grade. The assignment(s) will allow students to demonstrate at least 5 of the 7 General Education program outcomes.

Date Revised: 10/18/2022