Cuyahoga Community College

Viewing: BIO-1060: Environment, Ecology, and Evolution

Board of Trustees:
2018-05-24

Academic Term:
2018-08-27

Subject Code
BIO - Biology

Course Number:
1060

Title:
Environment, Ecology, and Evolution

Catalog Description:
Designed for non-science majors. Questions about the natural world are explored through an introduction to the principles of evolution and ecology, including how populations change over time and how organisms interact with each other and the environment. Topics include scientific inquiry; nature of science; evolutionary processes; diversity of life; population, community, and ecosystem ecology; human impacts on the environment; environmental stewardship; and regional environmental concerns.

Credit Hour(s):
3

Lecture Hour(s):
3

Lab Hour(s):
0

Other Hour(s):
0

Requisites

Prerequisite and Corequisite
ENG-0990 Language Fundamentals II, or appropriate score on English Placement Test.

I. ACADEMIC CREDIT

Academic Credit According to the Ohio Department of Higher Education, one (1) semester hour of college credit will be awarded for each lecture hour. Students will be expected to work on out-of-class assignments on a regular basis which, over the length of the course, would normally average two hours of out-of-class study for each hour of formal class activity. For laboratory hours, one (1) credit shall be awarded for a minimum of three laboratory hours in a standard week for which little or no out-of-class study is required since three hours will be in the lab (i.e. Laboratory 03 hours). Whereas, one (1) credit shall be awarded for a minimum of two laboratory hours in a standard week, if supplemented by out-of-class assignments which would normally average one hour of out-of-class study preparing for or following up the laboratory experience (i.e. Laboratory 02 hours). Credit is also awarded for other hours such as directed practice, practicum, cooperative work experience, and field experience. The number of hours required to receive credit is listed under Other Hours on the syllabus. The number of credit hours for lecture, lab and other hours are listed at the beginning of the syllabus. Make sure you can prioritize your time accordingly. Proper planning, prioritization and dedication will enhance your success in this course.

The standard expectation for an online course is that you will spend 3 hours per week for each credit hour.

II. ACCESSIBILITY STATEMENT

If you need any special course adaptations or accommodations because of a documented disability, please notify your instructor within a reasonable length of time, preferably the first week of the term with formal notice of that need (i.e. an official letter from the Student Accessibility Services (SAS) office). Accommodations will not be made retroactively.
For specific information pertaining to ADA accommodation, please contact your campus SAS office or visit online at http://www.tri-c.edu/accessprograms. Blackboard accessibility information is available at http://access.blackboard.com.

Regular class attendance is expected. Tri-C is required by law to verify the enrollment of students who participate in federal Title IV student aid programs and/or who receive educational benefits through other funding sources. Eligibility for federal student financial aid is based in part on enrollment status.

Students who do not attend classes for the entire term are required to withdraw from the course(s). Additionally, students who withdraw from a course or stop attending class without officially withdrawing may be required to return all or a portion of their financial aid based on the date of last attendance. Students who do not attend the full session are responsible for withdrawing from the course(s).

Tri-C is responsible for identifying students who have not attended a course before financial aid funds can be applied to students’ accounts. Therefore, attendance is recorded in the following ways:

- For in-person and blended-learning courses, students are required to attend the course by the 15th day of the semester (or equivalent for terms shorter than five weeks) to be considered attending. Students who have not met all attendance requirements for in-person and blended courses, as described herein, within the first two weeks or equivalent, will be considered not attending.
- For online courses, students are required to login at least two times per week and submit one assignment per week for the first two weeks of the semester, or equivalent to the 15th day of the term. Students who have not met all attendance requirements for online courses, as described herein, within the first two weeks or equivalent, will be considered not attending.

At the conclusion of the first two weeks of a semester or equivalent, instructors report any registered students who have “Never Attended” a course. Those students will be administratively withdrawn from that course. However, after the time period in the previous paragraphs, if a student stops attending a class or wants or needs to withdraw, for any reason, it is the student’s responsibility to take action to withdraw from the course. Students must complete and submit the appropriate Tri-C form by the established withdrawal deadline.

Tri-C is required to ensure that students receive financial aid only for courses that they attend and complete. Students reported for not attending at least one of their registered courses will have all financial aid funds held until confirmation of attendance in registered courses has been verified. Students who fail to complete at least one course may be required to repay all or a portion of their federal financial aid funds and may be ineligible to receive future federal financial aid awards. Students who withdraw from classes prior to completing more than 60 percent of their enrolled class time may be subject to the required federal refund policy.

If illness or emergency should necessitate a brief absence from class, students should confer with instructors upon their return. Students having problems with coursework due to a prolonged absence should confer with the instructor or a counselor.

Occasionally, in addition to submitting assignments to their instructors for evaluation and a grade, students will also be asked to submit completed assignments, called ‘artifacts,’ for assessment of course and program outcomes and the College’s Essential Learning Outcomes (ELOs). The artifacts will be submitted in Blackboard or a similar technology. The level of mastery of the outcome demonstrated by the artifact DOES NOT affect the student’s grade or academic record in any way. However, some instructors require that students submit their artifact before receiving their final grade. Some artifacts will be randomly selected for assessment, which will help determine improvements and support needed to further student success. If you have any questions, please feel free to speak with your instructor or contact the Learning Outcomes Assessment office.

College policy prohibits the possession of weapons on college property by students, faculty and staff, unless specifically approved in advance as a job-related requirement (i.e., Tri-C campus police officers) or, in accordance with Ohio law, secured in a parked vehicle in a designated parking area only by an individual in possession of a valid conceal carry permit.

As a Tri-C student, your behavior on campus must comply with the student code of conduct which is available on page 29 within the Tri-C student handbook, available at http://www.tri-c.edu/student-resources/documents/studenthandbook.pdf. You must also comply with the College’s Zero Tolerance for Violence on College Property available at http://www.tri-c.edu/policies-and-procedures/documents/3354-1-20-10-zero-tolerance-for-violence-policy.pdf

**Outcomes**

**Course Outcome(s):**

Analyze using supporting evidence how populations change genetically over time through the process of evolution resulting in the unity and diversity of life.
Objective(s):
1. Analyze the evolutionary relationships among taxa.
2. Compare and contrast the major characteristics of the domains, kingdoms, and phyla of life.
3. Explain the effect of a changing environment on the gene pool of a population.
4. Differentiate among the mechanisms by which populations change genetically over time.
5. Identify and explain the evidence supporting the theory of evolution.

Course Outcome(s):
Apply the process of scientific inquiry to explore questions about the natural world.

Objective(s):
1. Distinguish among an observation, hypothesis, experiment, conclusion and theory.
2. Distinguish between observations and inferences.
3. Use scientific inquiry to write a hypothesis, design an experiment, analyze data and draw a conclusion.

Course Outcome(s):
Identify, discuss, and analyze the relationships and interactions between living things and their environment.

Objective(s):
1. Identify different types of community interactions.
2. Describe the flow of energy through different trophic levels in the ecosystem.
3. Describe the major geochemical cycles in an ecosystem.
4. Compare and contrast the biotic and abiotic characteristics of the major terrestrial and aquatic biomes.
5. Describe and analyze characteristics of populations.

Course Outcome(s):
Analyze causes, evaluate effects, and propose solutions regarding human impact on the environment in order to make informed environmental decisions in daily life.

Objective(s):
1. Explain the effects of human activities on selected aquatic and terrestrial ecosystems.
2. Compare the costs and benefits of renewable and nonrenewable energy sources.
3. Recognize local, regional, and global environmental concerns.
4. Identify current approaches to conservation and sustainability of our planet's biosphere and natural resources.

Methods of Evaluation:
1. Exams
2. Quizzes
3. Interactive in-class quizzes
4. Class discussions
5. Assignments
6. Class activities
7. Article reviews/summaries
8. Journals/portfolios
9. Oral/written reports
10. Poster presentations

Course Content Outline:
1. Science as a process
   a. Observations
   b. Questions
   c. Hypotheses
   d. Predictions
   e. Experiment
   f. Data
   g. Variables
   h. Controls
i. Conclusions
j. Inferences
k. Theory

2. Evolutionary processes
   a. Speciation
   b. Natural selection
      i. Stabilizing selection
      ii. Disruptive selection
      iii. Directional selection
   c. Mutation
d. Genetic drift
e. Gene flow
f. Migration
g. Non-random mating
h. Adaptation
   i. Convergent evolution
   j. Parallel evolution
   k. Adaptive radiation
      a. Extinction
      b. Darwin's impact on biology

3. Evidence for evolution
   a. Fossil record
   b. Comparative anatomy
   c. Molecular biology
d. Biogeography
e. Direct observation

4. Tools for studying evolution
   a. Population genetics
   b. Phylogenetic analysis
c. Comparative biology

5. Classification of Life
   a. Taxonomy
   b. Linnaean nested hierarchy
c. Correspondence to evolutionary history
d. Evolutionary tree of life on a geological time scale

6. Ecology
   a. Population ecology
      i. Distribution
      ii. Growth
      iii. Survivorship
      iv. Demography
      v. Density-dependent and independent regulation
   b. Community ecology
      i. Predator-prey interactions and adaptations
      ii. Symbiotic relationships
      iii. Competition and competitive exclusion
      iv. Ecological niche
      v. Ecological disturbance and succession
      vi. Biodiversity
      vii. Foundation and keystone species
   c. Ecosystem ecology
      i. Energy flow
      ii. Trophic structure
      iii. Biomagnification
      iv. Biogeochemical cycling
         1. Water
         2. Carbon
         3. Nitrogen
4. Phosphorous
5. Sulfur
5. Watersheds
vi. Terrestrial and aquatic biomes

7. Conservation of biodiversity and our environment
   a. Types of biodiversity
      i. Genetic
      ii. Chemical
      iii. Species
      iv. Ecosystem
   b. Patterns of biodiversity
   c. Value of biodiversity
      i. Pharmacological resources
      ii. Food and water resources
      iii. Economic benefits
   d. Threats to biodiversity
      i. Habitat alteration and destruction
      ii. Pollution
      iii. Overharvesting
      iv. Extinction
      v. Invasive exotic species
      vi. Global warming
   e. Preserving biodiversity
      i. Habitat preservation
      ii. Resource conservation
      iii. Preserves
      iv. Habitat restoration
      v. Bioremediation

8. Science versus non-science
   a. Science’s role in shaping policy
      i. Endangered species act
      ii. Clean air act
      iii. Clean water act
   b. Evolution as a scientific theory
   c. Sustainability
   d. Tragedy of the commons
   e. Environmental stewardship

Resources


**Resources Other**
Tree of Life web project: http://www.tolweb.org/tree/
Understanding Evolution website from UC Berkeley: https://evolution.berkeley.edu/evolibrary/article/0_0_0/nature_01
Howard Hughes Medical Institute BioInteractive Evolution page: http://www.hhmi.org/biointeractive/evolution-collection

**Instructional Services**

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