

Course Outline for: BIOL 1110 Environmental Biology**A. Course Description:**

1. Number of credits: 3
2. Lecture hours per week: 3
3. Prerequisites: ENGC 0960 (C- or better) OR READ 0960 (C- or better) OR High School GPA of 2.60+ OR ACT Sub-Score of 21+ OR ACT Sub-Score of 19+ and High School GPA of 2.50+ OR SAT Read/Write score of 480+ OR SAT Read/Write score of 440+ and High School GPA of 2.50+ OR Accuplacer Reading score of 250+ OR Accuplacer Reading score of 236+ and High School GPA of 2.50+ OR MCA Reading score of 1047+ OR MCA Reading score of 1042-1046 and High School GPA of 2.50+
4. Corequisites: None
5. MnTC Goals: #3 Natural Sciences and #10 People and the Environment

A non-majors general education course without lab. Introduction to and analysis of ecological principles, resources, population, energy and pollutants and their relationships to Minnesota and global environmental concerns.

B. Date last reviewed/updated: January 2023**C. Outline of Major Content Areas:**

Subtopics listed under each main topic may vary due to recent developments in the field and current events.

1. Introduction to Environmental Science
 - a. Identification of major environmental and resource problems and their causes
 - b. Identification of the underlying causes of environmental and resource problems
 - c. Scope of environmental science
2. Fundamental Ecological Concepts
 - a. Ecosystem structure and function
 - b. Energy flow in ecosystems
 - c. Nutrient cycling in ecosystems
3. The Human Population
 - a. Exponential and logistic population growth
 - b. Human population growth: trends and prospects
 - c. Implications of human population growth and unsustainable consumption
 - d. Sustainable solutions
4. Energy
 - a. Renewable and nonrenewable energy sources
 - b. Solutions: A sustainable-earth energy strategy
5. Biodiversity: Sustaining Ecosystems
 - a. Earth's major ecosystem types

- b. Global deforestation
 - c. Solutions: Protection and sustainable management of public lands, national parks, bioserves, wilderness and the oceans
- 6. Biodiversity: Sustaining Nature and Species
 - a. The importance of nature and biodiversity
 - b. Threats to biodiversity
 - c. The current extinction crisis
 - d. Solutions: Protecting wild species from extinction
- 7. Food and Agriculture
 - a. Soil ecology and soil degradation
 - b. Traditional and industrialized agriculture; the green revolution
 - c. World food problems
 - d. Solutions: Sustainable food production
- 8. Atmosphere and Climate
 - a. Greenhouse effect and global warming
 - b. Ozone depletion
 - c. Acid precipitation
 - d. Solutions: Protecting the atmosphere
- 9. Water
 - a. The hydrologic cycle
 - b. Lake and river ecology
 - c. Water pollution problems and their solutions
 - d. Solutions: Sustainable water use
- 10. Wastes
 - a. Solid waste: types and production of
 - b. Hazardous waste: types and production of
 - c. Waste management and pollution (waste) prevention: reducing, reusing, recycling, incinerating, and burying
 - d. Waste prevention: reducing, reusing, recycling
 - e. Solutions: Transition from a throwaway society to a low-waste society
- 11. Environmental Health and Toxicology
- 12. Urban Diversity and Sustainability
 - a. Human attitudes toward the environment
 - b. Economic systems and environmental problems
 - c. Sustainable development and sustainable-earth economies
 - d. Politics and development of environmental policy
 - e. Solutions: Making the connection between environmental, resource, and social problems

D. Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

1. Describe basic scientific theories and concepts and relate them to environmental and resource problems and possible solutions. (Goal 3a, 10a)
2. Describe the basic structure and function of natural ecosystems and of human adaptive strategies within those systems using the vocabulary of ecology and environmental science. (Goal 2a, 3d, 10d)

3. Identify the basic steps of the scientific method, analyze observations and experiments conducted to determine the effect of human-caused changes to natural ecosystems, and communicate results in writing and oral presentation. (Goal 3c)
4. Identify current societal issues (on a local, state, national and/or global scale) that have relevance to environmental biology and prepare a written or oral critique of those issues from a biological perspective. (Goal 2a, 2d, 3d, 10c)
5. Assess and evaluate environmental and resource problems and their possible solutions from a multidisciplinary (i.e., social, legal, political, economic, religious) perspective. (Goal 2a, 2c, 2d, 3d, 10c, 10d, 10e)
6. Articulate and defend a sustainable-earth worldview, verbally or in writing. (Goal 10f)

E. Methods for Assessing Student Learning:

A variety of evaluation and assessment methods may be used:

1. Tests (multiple choice, true-false, fill-in-the-blank, matching, short answer, and critical thinking essay questions)
2. Home study assignments
3. Work sheets
4. Short writing assignments
5. Class debates
6. Term papers
7. Oral presentations
8. A final comprehensive exam

F. Special Information:

Instructors will include the most recent version of the Departmental Expectations document in their course syllabus.