



COURSE OUTLINE

Course Number BIO 114	Course Title Environmental Science Concepts	Credits 3
Hours: Lecture/Lab/Other 3 lec	Co- or Pre-requisite ENG 024	Implementation Semester & Year Fall 2022

Catalog description:

Exploration of the fundamental concepts of our local, regional, and global environment for the non-science major. Topics include the aquatic and terrestrial ecosystems, biological and chemical principles that relate to current environmental issues, basic ecological relationships which include plants and animals, ecological and technological concerns, and advances, as well as scientific analysis and solutions to current and future environmental problems. This is a non-laboratory course.

General Education Category:

Goal 3: Science

Course coordinator:

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Required texts & Other materials:

The following books are available free access from the websites listed below and through the BlackBoard course page.

1. Environmental Biology, edited by Matthew R. Fisher
(<https://openoregon.pressbooks.pub/envirobiology/>)
2. Environmental ScienceBites, Volume 1, edited by Kylienne A. Clark, Travis R. Shaul, and Brian H. Lower and Edited by Kylienne A. Clark, Travis R. Shaul, and Brian H. Lower
(<https://ohiostate.pressbooks.pub/sciencebites/>)
3. Environmental ScienceBites, Volume 2, edited by Brian H. Lower, Travis R. Shaul, Kylienne A. Shaul, and Ella M. Weaver (<https://ohiostate.pressbooks.pub/sciencebitesvolume2/>)

Course Student Learning Outcomes (SLO):

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

1. Identify and discuss technological, biological, and chemical developments (past and present) that have impacted the environment, positively and negatively [Supports ILG #1, 2, 3, 4, 8, 9, 10, 11].
2. Analyze the complexities of environmental issues in our daily lives, including political and ethical concerns and sociological consequences [Supports ILG #1, 2, 3, 4, 8, 9, 10, 11].
3. Assess current causes, status, alternatives, and consequences of alternative solutions to environmental problems [Supports ILG #1, 2, 3, 4, 8, 9, 10, 11].
4. Promote environmental awareness and citizen involvement in the preservation of the environment, both now and in the future [Supports ILG #1, 2, 3, 4, 8, 9, 10, 11].

Course-specific Institutional Learning Goals (ILG):

Institutional Learning Goal 1. Written and Oral Communication in English. Students will communicate effectively in both speech and writing.

Institutional Learning Goal 2. Mathematics. Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.

Institutional Learning Goal 3. Science. Students will use the scientific method of inquiry, through the acquisition of scientific knowledge.

Institutional Learning Goal 4. Technology. Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.

Institutional Learning Goal 8. Diversity and Global Perspective: Students will understand the importance of a global perspective and culturally diverse peoples.

Institutional Learning Goal 9. Ethical Reasoning and Action. Students will understand ethical frameworks, issues, and situations.

Institutional Learning Goal 10. Information Literacy: Students will recognize when information is needed and have the knowledge and skills to locate, evaluate, and effectively use information for college level work.

Institutional Learning Goal 11. Critical Thinking: Students will use critical thinking skills understand, analyze, or apply information or solve problems.

Units of Study in Detail – Unit Student learning Outcomes:

Unit I Intro to Environmental Science, Energy, Biodiversity, and Climate Change [Supports SLO #1, 2, 3, 4]

Learning Objectives

The student will be able to:

- Distinguish among highly developed countries, moderately developed countries, and less developed countries.
- Distinguish between people overpopulation and consumption population.
- Describe the three factors that are most important in determining human impact on the environment. Identify human behaviors that threaten environmental sustainability.
- Identify human behaviors that threaten environmental sustainability.
- Identify some of the complexities associated with the concept of sustainable consumption.
- Identify greenhouse gases and evaluate their effect on climate change and mitigation of global climate change.

Unit II Ecosystems & Biosphere, Community & Population Ecology, and Human Health [Supports SLO #1, 2, 3, 4]

Learning Objectives

The student will be able to:

- Identify ecological levels to include population, community, ecosystems, landscape, and biosphere.
- Relate poverty and population growth to carrying capacity and global sustainability.
- Distinguish the states of energy, producers, consumers, and decomposition as well as energy flow through a food web.
- Identify the cycling of matter in ecosystems: carbon, hydrologic, nitrogen, sulfur, and phosphorus cycles.
- Identify factors contributing to an organism's biological niche and resource partitioning.
- Distinguish interactions among organisms, relationships among organisms, competition, and keystone species.
- Identify the major terrestrial biomes and characteristic organisms and climate.
- Identify environmental factors that affect aquatic ecosystem including environmental characteristics of each.
- Distinguish human population: size, biotic potential, history, carrying capacity.
- Interpret Thomas Malthus's ideas and describe problems associated with urbanization and rapid population growth.
- Identify risk to include health threats and effects of pollutants and their effects on humans.
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Unit III Water Availability & Use and Air Pollution & Ozone Depletion [Supports SLO #1, 2, 3, 4]

Learning Objectives

The student will be able to:

- Describe the hydrologic cycle, structure, and properties of water.
- Identify water resource problems and describe water pollution: eutrophication, BOD, groundwater pollution giving examples of each.
- Describe sustainable water use: dams, reservoirs, and water concentration in agriculture.
- Evaluate ways of improving water.
- Differentiate the layers and gases in the atmosphere and the Coriolis Effect.
- Distinguish the major classes of air pollutants; including their characteristics and sources, adverse effects, and ways to control outdoor air pollutants.
- Describe indoor pollution: sources and effects on developing countries.
- Distinguish between weather and climate, solar energy, and regional precipitation.
- Identify and describe ozone depletion in the stratosphere and acid deposition.

Unit IV Food & Hunger, Conventional & Sustainable Agriculture, and Conventional & Sustainable Energy [Supports SLO #1, 2, 3, 4]

Learning Objectives

The student will be able to:

- Distinguish the principal types of agriculture, challenges of agriculture, evaluate solutions to agricultural problems and controlling agricultural pests as well as identifying and comparing world food problems.
- Distinguish between solid wastes and their methods of disposal as well as reduction methods.
- Examine reduction methods of solid waste and identify hazardous wastes and their management.
- Describe direct solar power: pros and cons of solar energy relating to conversion of solar electric energy, how fuel cell work, indirect solar energy including: biomass, wind energy, and hydropower, as well as distinguish between geothermal and tidal energy.

Evaluation of student learning:

Questions on exams are from readings, assignments, videos, or other material presented. Grades are based on the total accumulation of earned points. Grades are based on the total accumulation of earned points throughout the semester on opinion papers, discussion board, exams, case studies, biome project, and a research paper.

Assignment	Number @ point value	Total Point Value
Lecture Tests	4 @ 50 points each	200 points
Biomes Writing Assignment	50 points	50 points
Reaction Paper	3 @ 25 points each	75 points
Research Paper Position Statement	10 points	10 points
Research Paper Annotated Bibliography	25 points	25 points
Research Paper	100 points	100 points
Discussion Boards	9 @ 20 points each	180 points
Case Studies	4 @ 25 points each	100 points
TOTAL POINTS		740 points
Final Grade =	(Total points / 7.4)	

A	93-100%	B+	87-89%	C+	77-79%	D	60-69%
A-	90-92	B	83-86	C	70-76	F	<60%
		B-	80-82				