

HIBBING COMMUNITY COLLEGE COURSE OUTLINE

COURSE NUMBER & TITLE: ENSC 1050 - Environmental Science

CREDITS: 3 (2 Lec / 1 Lab)

PREREQUISITES: None

CATALOG DESCRIPTION:

Environmental Science emphasizes the relationship of humans to the environment. Topics covered include ecological principles, energy use, pollution, waste, population, and natural resources. Causes, effects, and solutions dealing with environmental problems will be emphasized. Environmental sampling and laboratory investigations of environmental problems are important components of this course. Field trips to various sites in the region will be taken. MNTEC goal areas: (3)Natural Science and (10)People and the Environment(EN).

OUTLINE OF MAJOR CONTENT AREAS:

- I. Introduction to environmental science
 - A. Goals of environmental science
 - B. Scientific analysis of environmental problems
 - C. Solutions to environmental problems
 - D. Global environmental challenges
- II. Ecosystems and the physical environment
 - A. Energy flow through ecosystems
 - B. Inhabitants of ecosystems
 - C. Ecological niches
 - D. Symbiotic relationships
 - E. Ecological succession
 - F. Nutrient cycling
 - G. Ecosystems of the world
- III. Human population growth
 - A. Population ecology
 - B. Human population characteristics
 - C. Effects of overpopulation
 - D. Methods for reducing human population
- IV. Energy use in society
 - A. Fossil fuels
 - B. Nuclear energy
 - C. Alternative energy sources
 - D. Energy conservation
 - E. Renewable energy resources
- V. Natural resources
 - A. Water

- B. Soils
- C. Minerals
- D. Wildlife
- E. Land
- F. Food
- VI. Pollution and pollution control
 - A. Air pollution
 - B. Global atmospheric changes
 - C. Water pollution
 - D. Soil pollution
 - E. Pesticides
 - F. Solid waste
 - G. Hazardous waste
 - H. Sewage

COURSE GOALS/OBJECTIVES/OUTCOMES:

Students will

1. list the goals and objectives of environmental science.
2. list and describe the major environmental problems created by humans list and explain the steps that are typically taken to solve environmental problems.
3. integrate information from the fields of biology, chemistry, physics, geology, sociology, government, politics, and demographics into the study of environmental and natural resource challenges.
4. formulate hypotheses, design experiments, collect data, and analyze results concerning a variety of environmental problems.
5. participate in a student research project and write a scientific paper on the results.
6. propose and assess alternative solutions to environmental problems describe the levels of ecological organization.
7. explain the fundamental laws of energy and provide examples of ways in which human environmental problems are related to these laws.
8. construct diagrams which illustrate a food chain, a food web, a pyramid of energy, and a pyramid of numbers.
9. explain how toxic substances move through an ecosystem.
10. define niche and provide examples.
11. list three symbiotic relationships and provide examples of each.
12. describe how communities change through time via succession.
13. diagram, label, and explain the major biogeochemical cycles influencing ecosystems.
14. name the ecosystems of the world and provide a description of the major characteristics of each.
15. describe the major principles of population ecology.
16. enumerate the variables which affect human population growth and decline.

17. participate actively in a classroom discussion of the ramifications of human overpopulation and apply issues raised in that discussion to evaluate strategies of population control.
18. compare and contrast selected population control programs from various parts of the world.
19. list several examples of fossil fuels.
20. explain the process of nuclear power generation.
21. list several alternative energy sources.
22. list and explain several energy conservation strategies.
23. assess the major environmental problems associated with the use of fossil fuels and nuclear energy.
24. evaluate strategies to solve world energy use problems.
25. describe the world's water resources, evaluate problems associated with water use, and suggest solutions to water use problems.
26. describe the process of soil formation, evaluate problems associated with soil use, and suggest solutions to soil use problems.
27. describe the various mineral resources of the world, list ways in which the earth is degraded by mineral exploitation, and describe several strategies to solve current and future mineral use problems.
28. list several benefits of wildlife resources, evaluate the major threats to wildlife species, and suggest solutions to problems concerning wildlife resources.
29. differentiate among various land-use issues of the United States and evaluate strategies to address these issues.
30. participate actively in classroom discussion of the major problems associated with world food resources and apply issues raised in that discussion to suggest strategies for solving world food resource problems.
31. list the major types of air pollution, assess the causes of air pollution, and describe strategies for solving air pollution problems.
32. list the major water pollutants, evaluate the causes of water pollution, and describe strategies for solving water pollution problems.
33. explain the major threats to soil and describe a variety of solutions to solve soil pollution problems.
34. outline the benefits and drawbacks of pesticide use and describe the components of an integrated approach to pest control.
35. distinguish among sewage, solid waste, and hazardous waste.
36. describe and evaluate strategies commonly employed to address problems associated with sewage, solid waste, and hazardous waste
37. gain an appreciation of Earth's natural systems and the need to preserve them.

MNTC GOALS AND COMPETENCIES MET:

Natural Sciences

People and the Environment

HCC COMPETENCIES MET:

Working Productively and Cooperatively
Communicating Clearly and Effectively
Thinking Creatively and Critically

STUDENT CONTRIBUTIONS:

Students are expected to attend all lecture and laboratory sessions, participate in and contribute to class discussions, complete all assignments on time, and request assistance when needed. Attendance is critical for the successful completion of this course. Students must abide by all the rules of laboratory safety, act in a responsible manner, and treat others with respect.

STUDENT ASSESSMENT SHALL TAKE PLACE USING INSTRUMENTS SELECTED/DEVELOPED BY THE COURSE INSTRUCTOR.**SPECIAL INFORMATION:**

The laboratory portion of this course may involve moderate physical activities, exposure to harmful chemicals, and field work under extreme weather conditions. Students will be supplied with pertinent information relating to these activities at the appropriate time. Students are expected to abide by all laboratory safety procedures, as distributed to students prior to the initial laboratory session.

Clothing appropriate to the field situation should be worn.

AASC APPROVAL DATE: November 16, 2011
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REVIEW DATE: November 2016

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