Course Outline for Geography 10
GLOBAL ENVIRONMENTAL PROBLEMS

Catalog Description:
GEO 10 - Global Environmental Problems 3.00 units
Essential concepts of the interaction between human activities and the changing global environment, with emphasis on a multidisciplinary approach. Causes of environmental change, including ecosystem processes, the history of human population growth and demand for natural resources, fossil fuel consumption, land use change, and pollution sources. Economic and public policy issues pertaining to the sustainability of environments. Discussion of the dynamics of participation and leadership in promoting improved stewardship of the environment.
Requisites: none

Grading Option: Optional

Discipline:

<table>
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<tr>
<th>Type</th>
<th>Units</th>
<th>Inside of Class Hours</th>
<th>Outside of Class Hours</th>
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<td>54.00</td>
<td>108.00</td>
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<tr>
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<td><strong>72.00</strong></td>
<td><strong>108.00</strong></td>
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Prerequisite Skills:
None

Measurable Objectives:
Upon completion of this course, the student should be able to:
1. describe environmental studies as a newly emerging field of holistic study and its relationships to other disciplines;
2. assess and apply environmental and ecological concepts to modern life and a technology-based society;
3. assess how the history of human activities and use of natural resources has affected processes in nature;
4. explain the impacts of the Industrial Revolution and other stages of technological advancement on environmental change and the relationship between humans and nature;
5. compare and contrast the history of land use ethics in Western versus non-Western cultures;
6. evaluate the effects of the conservation and environmental movements in the United States;
7. assess how political processes in the United States interact with environmental change, and how they influence public policies and regulations regarding the environment;
8. assess and debate the current balance of the world’s natural resources with human population growth;
9. analyze approaches to sustainability of ecosystems and natural resources;
10. itemize the most significant changes occurring in recent decades in the interaction of atmosphere, hydrosphere, lithosphere, and biosphere;
11. identify the major types of environmental evidence observed in monitoring climate change, as well as the causes and consequences of global warming;
12. apply knowledge of the distribution of resources, environmental hazards, and human-environmental interactions to rational decision-making processes and activities which affect the habitability of Planet Earth.

Course Content:
1. What is Environmental Studies?
   A. Definition(s) of ecological approaches
   B. Relationship of environmental studies to other disciplines
      a. ecology
      b. natural sciences
      c. social sciences
      d. business
      e. law
2. Principles of natural and human ecosystems
   A. History of the ecological sciences
   B. Approaches to studying environmental change
Assignments and Methods of Evaluating Student Progress

3. History of human activities' impacts on natural systems
   A. Stages of cultural development and resource use
   B. Impacts of early agricultural systems
   C. Impacts of urbanization
   D. Effects of the diffusion of agricultural innovations
   E. Overview of environmental changes of the last 100 years

4. The Industrial Revolution and its cultural influences
   A. Development of fuels for energy production
   B. Influence of mass production and urbanization
   C. Emergence of natural resources extraction industries
   D. The Agricultural Revolution and its environmental impacts
   E. Accelerated population growth and consumption of resources

5. Comparison of cultural traditions in land use ethics
   A. Western cultures and land use
   B. Non-Western cultures and land use
   C. The emergence of indigenous people's rights and relationships to nature

6. Historical stages in the emergence of the conservation and environmental movements
   A. Darwinism and ecosystem concepts
   B. First wave of 20th century conservation: 1900-1930
   C. Second wave of 20th century conservation: 1930-1960
   D. The environmental movement of the 1960s
   E. Post-1970: ecosystem sustainability and environmental change

7. Politics and public policy relating to the environment
   A. Environmental advocacy—government and non-governmental organizations
   B. Milestone legislation in environmental law
      a. Endangered Species Act
      b. Clean Air Act
      c. Superfund Cleanup
   C. Environmental impact provisions
   D. Regulation of energy industries
   E. Environmental policy and its relationship to U.N. Millennium Development Goals

8. Population growth and population policy
   A. The Malthusian concept
   B. Agricultural innovation in the developing world
   C. Urbanization trends and their environmental impacts

9. Sustainability of ecosystems and renewable resources
   A. Concepts of sustainability
   B. Deforestation and forest management
   C. Soil conservation methods
   D. Alternative renewable energy sources

10. Inter-linkages of Earth's natural systems
    A. Biogeochemical cycles and monitoring environmental change
       a. The hydrologic cycle
       b. The carbon cycle
       c. The oxygen cycle
       d. The nitrogen cycle
       e. Nutrient cycles
    B. Feedback mechanisms in natural systems
    C. Principles of atmospheric circulation
    D. Principles of oceanic circulation
    E. Observations and forecasts of anthropogenic environmental change

11. Indicators of environmental change and global warming
    A. Trends in carbon dioxide and other greenhouse gas emissions
    B. The enhanced greenhouse effect and global warming
    C. Climate modeling and other technologies of environmental monitoring
    D. Global warming threats to terrestrial and aquatic ecosystems
    E. Acid deposition
    F. Photochemical smog
    G. Sea level rise and its implications
    H. Climate change forecasts for the 21st century

12. Prospects for environmental conservation
    A. International initiatives
    B. The ethics of environmental change and resource consumption
    C. Geoengineering
    D. Achieving sustainable development

Methods of Presentation

1. Lecture/Discussion
2. Demonstration/Exercise
3. Video- or web-based learning modules
4. Exercises

Assignments and Methods of Evaluating Student Progress

1. Typical Assignments
   A. In an essay format, describe 20th century technological innovations and diffusion that have resulted in environmental degradation.
   B. Research and report on one technology that has been implemented to monitor environmental change and environmental quality, for example: 1) satellite imagery and digital image processing. 2) geographic information systems (GIS) 3) field instrumentation for collecting weather, climate, and hydrological information 4) ground-based remote sensing (e.g. radar systems)
   C. Report on an ongoing environmental action or litigation effort in the San Francisco Bay Area, by means of a class presentation or written report.
   D. Write a letter to a state legislator or Member of Congress expressing concern over an environmental problem and, from an informed citizen standpoint, arguing for or against a particular piece of legislation.
   E. Interview someone knowledgeable about environmental degradation, environmental justice, environmental law, or renewable and sustainable energy alternatives, and report on that person's perspectives on particular issues.
   F. Add themes to a data view from multiple sources, including: 1) a personal directory of themes 2) a digital image library 3) an
event theme

G. Develop a poster board, PowerPoint presentation, or cartographic product that illustrates the components and processes of a natural, technological, or political system involved in the interaction between human activities and ecosystems.

2. Methods of Evaluating Student Progress
   A. Exams/Tests
   B. Quizzes
   C. Papers
   D. Oral Presentation
   E. Final Examination or Project

3. Student Learning Outcomes
   Upon the completion of this course, the student should be able to:
   A. Assess how human activities, including the use of energy and natural resources, affects the natural environment, and how those activities have changed since the period of the Industrial Revolution
   B. Explain how the maintenance of biodiversity influences the evolutionary process and enhances ecosystem stability
   C. Identify the major globally-applicable physical processes affecting environmental change
   D. List the most significant observed changes in the atmosphere, ocean, and landmasses over the last 50 years

Textbooks (Typical):

Special Student Materials
Abbreviated Class Schedule Description:

   Essential concepts of the interaction between human activities and the changing global environment, with emphasis on a multidisciplinary approach.

   Requisites: none