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## Course Outline for BIO 40

### HUMANS AND THE ENVIRONMENT (FOMERLY ECOL 10)

Effective: Fall 2015

#### I. CATALOG DESCRIPTION:

BIO 40 — HUMANS AND THE ENVIRONMENT (FOMERLY ECOL 10) — 3.00 units

Identification of problems created by humans' modification of their environment by focusing on ecological interactions involving the human species; investigating the life processes of organisms as they relate to specific environments. 3 hours.

3.00 Units Lecture

#### Grading Methods:

Letter or P/NP

#### Discipline:

	<u>MIN</u>
<b>Lecture Hours:</b>	54.00
<b>Total Hours:</b>	54.00

#### II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 1

#### III. PREREQUISITE AND/OR ADVISORY SKILLS:

#### IV. MEASURABLE OBJECTIVES:

**Upon completion of this course, the student should be able to:**

1. explain basic ecological concepts involving energy flow; energy transformations by autotrophy and heterotrophy; decomposition and the cycling of matter; interacting within and between populations
2. recall defining characteristics and examples of biomes, communities, and ecosystems
3. compare the diversity of life and universal principles for all living things
4. explain human food production, water quality and supply, atmospheric modification, energy supply and usage, and land use practices in the context of the ecological principals set forth in the course
5. analyze and critically evaluate environmental information as it is increasingly mass produced by the various media

#### V. CONTENT:

- A. Population, Resources, Pollution: Overview
- B. Human population growth
- C. History of resource use and conservation
- D. Matter and energy resources: Basic concepts
- E. Ecosystem concept
  1. Energy flow
  2. Biogeochemical cycles
  3. Ecological niches and food webs
  4. Basic types of ecosystems
- F. Biome types and their problems
- G. Ecosystem change
  1. Population ecology and evolution
  2. Ecological succession
- H. Aquatic ecology
  1. Freshwater ecology
  2. Estuarine and marine ecology
- I. Water resources and water pollution
  1. California, US and global water usage
  2. Point and nonpoint sources of water pollution
- J. Land resources
  1. Public lands classification and management
  2. Forests and forest management
- K. Soil resources
- L. Food production
  1. Origins and growth of agriculture
  2. World agriculture systems
  3. The Green Revolution
  4. Sustainable agriculture and organic farming
- M. Wild plant and animal resources
  1. Biodiversity

- 2. Endangered species
- 3. Extinction
- N. Solid Waste Management
  - 1. Hazardous Waste Disposal
  - 2. Reduce, Reuse, Recycle and Rot
- O. Biotechnology
  - 1. Reproductive cloning
  - 2. Genetically Modified Organisms
- P. Economics and politics of resource use and conservation
  - 1. Tragedy of the Commons
  - 2. Ecological Footprint
  - 3. Sustainability
- Q. Climate Change and Ozone Loss
  - 1. Global Warming
  - 2. Carbon Footprint
- R. Non-renewable energy sources
  - 1. Coal, natural gas, oil
- S. Renewable energy sources
  - 1. Wind, solar, hydroelectric, biofuel

#### VI. METHODS OF INSTRUCTION:

- A. **Lecture** - Lecture and discussion on major themes and concepts
- B. Readings from the text, supplementary materials, primary source materials
- C. **Discussion** - Discussions and problem solving of significant and controversial issues
- D. **Audio-visual Activity** - Utilization of video and other audio visual aids
- E. **Lecture** -
- F. **Student Presentations** -
- G. **Written exercises and case studies** - Written assignments
- H. **Demonstration** - Demonstrations and simulations
- I. **Field Trips** -

#### VII. TYPICAL ASSIGNMENTS:

- A. Reading and discussion
  - 1. Read Chapter 5, "Evolution, Biodiversity, and Community Processes." Be prepared to explain how you would respond to someone who says that they don't believe in evolution because it is "just a theory".
  - 2. Read Chapter 10, "Air and Air Pollution." Be prepared to discuss and defend your opinion on the possible weaknesses of the U.S. Clean Air Act listed on
  - 3. Read Chapter 3, "Ecosystems, What They Are and How Do They Work?" Explore examples of human's affect on food webs by addressing this key question: How has Global Warming, over-fishing, pesticides or genetic engineering disrupted food webs?
- B. Writing
  - 1. Research and write a term paper pertaining to one of the primary topic areas discussed in this course. Cite references in proper format by including a bibliography.
  - 2. Research and write a brief report discussing what happens to solid waste in your community. How much is land filled? Incinerated? Composted? Recycled? What technology is used in local landfills or incinerators? What leakage and pollution problems have local landfills or incinerators had?
- C. Collaborative learning
  - 1. As a group of 4 to 6 students select a controversial topic. Half of the group prepares arguments and explanations in favor of the issue, half the group will be arguing on the opposing side. Each partner has a designated part of the problem to present to the class. After the presentation the whole class will be involved in the discussion. a. Example of a topic: Are aggressive international efforts needed to avoid global warming?
  - 2. The class is subdivided into groups of
  - 3. Each group discusses one specific question of a problem. More than one group is assigned to each question and the groups' conclusions about each question are compared and contrasted.
    - a. Example of a topic: The WWF has asked you to evaluate the importance of mutualism to ecosystems as the organization is concerned about the present rate of extinction. Example questions: What would the world be like without seed dispersal by animals? What would the world be like without plant-microbial/fungal associations facilitating nutrient acquisition by plants?

#### VIII. EVALUATION:

- A. **Methods**
    - 1. Exams/Tests
    - 2. Quizzes
    - 3. Other:
      - a. Chapter quizzes (multiple choice and short answer format)
        - 1. Example questions:
          - a. Biomass is
            - 1. The total dry weight of organic matter in living things.
            - 2. The major environmental problem caused by a large population
            - 3. The system by which manufacturers buy large weights of materials
            - 4. What a sustainable society should strive for
            - 5. A religious ceremony performed in earth-worshipping societies
          - b. What agencies add and remove species from the ESA list?
        - 2. Midterm and final examinations (multiple choice, short answer and essay questions)
        - 3. Written assignments
- B. **Frequency**
  - 1. Minimum of one midterm examination
  - 2. Minimum of one written assignment and/or group project
  - 3. Final examination

#### IX. TYPICAL TEXTS:

- 1. G. Tyler Miller, JR *Environmental Science – Working with the Earth*. 11th ed., Brooks/Cole, 2007.

#### X. OTHER MATERIALS REQUIRED OF STUDENTS: