ENVS C100: INTRODUCTION TO ENVIRONMENTAL SCIENCE

Item	Value
Curriculum Committee Approval Date	11/15/1996
Top Code	030200 - Environmental Studies
Units	3 Total Units
Hours	54 Total Hours (Lecture Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S), • Pass/No Pass (B)
California General Education Transfer Curriculum (Cal-GETC)	• Cal-GETC 5A Physical Science (5A) • Cal-GETC 5B Biological Sciences (5B)
Intersegmental General Education Transfer Curriculum (IGETC)	• IGETC 5A Physical Science (5A) • IGETC 5B Biological Sciences (5B)
California State University General Education Breadth (CSU GE-Breadth)	• CSU B1 Physical Science (B1) • CSU B2 Life Science (B2)

Course Description

An introduction to environmental science through an examination of society's use of soil, water, mineral, and energy resources, and the environmental consequences of resource exploitation. This course examines human population growth and sustainable management of biodiversity and natural resources by applying the scientific method of hypothesis testing to understand the implications of human activities within the global ecosystem. Transfer Credit: CSU; UC. C-ID: ENVS 100.**C-ID:** ENVS 100.

Course Level Student Learning Outcome(s)

1. Demonstrate scientific literacy and ability to engage in scientific inquiry concerning environmental issues.
2. Develop possible solutions for current environmental issues.
3. Demonstrate social responsibility by using critical thinking skills.

Course Objectives

- 1. Apply the scientific method to identify and solve everyday problems in resource management.
- 2. Identify the interconnectedness of a variety of disciplines that play a role in environmental science.
- 3. Identify practices that promote efficient use of water, soil, mineral, and biological resources to meet agricultural, waste management, and energy requirements of society.
- 4. Evaluate the ecological impacts of personal decisions on the local, regional, national, and global environment.
- 5. Identify the contribution of human activities to global climate change.
- 6. Differentiate between peer-reviewed publications and other media sources to determine the validity of information.

Lecture Content

INTRODUCTION Environmental science and sustainability The scientific method: forming and testing hypotheses Biogeochemical cycles Biodiversity Ecosystem services Conservation and environmentalism AGRICULTURE AND FOOD SUPPLY World hunger and distribution of world food resources Carbon footprint of food production Soil conservation The Green Revolution Integrated pest management Impacts on biodiversity WATER AS A RESOURCE The hydrologic cycle and the water budget The worlds major water sources Water use efficiency Water crisis - case studies of solutions for the depletion of the groundwater resource Impacts of human water use on biodiversity Thermohaline circulation and global climate MINERAL RESOURCES Definition and distribution of ore deposits Metallic and nonmetallic mineral resources Production, consumption, and conservation of mineral resources Marine mineral resources Impacts of mining activities and mineral processing ENERGY RESOURCES—FOSSIL FUELS The origin and migration of oil and natural gas The supply and demand for oil and natural gas Coal formation, resources, gasification, and liquefaction Oil shale, tar sands, and alternate sources of natural gas Environmental impacts of fossil fuels ENERGY RESOURCES—SOLAR Introduction and history of solar energy development and distribution Solar-thermal energy systems ENERGY RESOURCES—WIND Introduction and history of wind-power development Principles of wind power and wind turbine operation Hypothesis and experiments in turbine design and site analysis Horizontal-axis wind turbines Vertical-axis wind turbines Wind-power site characteristics ENERGY RESOURCES—GEOTHERMAL Introduction and history of geothermal energy development Vapor-dominated geothermal energy systems Liquid-dominated geothermal energy systems Binary-cycle geothermal energy systems Geothermal operational and environmental problems—continuing research and testing ENERGY RESOURCES—MISCELLANEOUS Energy from biomass Energy from hydrogen Small-scale hydropower POLLUTION Oxides of sulfur, nitrogen, and carbon; particulate matter Acid precipitation and the Greenhouse Effect—an analysis of research methods Scrubbers, electrostatic precipitators, and filters Nuclear power and the environment High-level radioactive waste Plastics WASTE MANAGEMENT Hazardous wastes Strategies for waste management Consumption and waste production WATER POLLUTION Pathogenic organisms, eutrophication Toxic inorganic materials and organic chemicals Sediment, thermal pollution, and thermal shocks Surface water-, groundwater-, and ocean pollution Water pollution control technologies AIR POLLUTION Natural sources of air pollution Anthropogenic primary, secondary, and fugitive air pollution Effects of air pollution and air-pollution-control technologies

Method(s) of Instruction

- Lecture (02)
- DE Online Lecture (02X)

Instructional Techniques

Traditional instructional techniques will be enhanced by literature review of experimental evidence and case studies that identify and address important environmental issues. The course will also include critical-thinking Internet-based essay questions for the midterm exam and critical-thinking Internet-based extra-credit options. As an assignment,

students will formulate a hypothesis and propose appropriate tests to study an environmental problem using the scientific method.

Reading Assignments

Peer-reviewed articles, textbook chapters, government and academic websites

Writing Assignments

essay questions, short answer questions, discussion forum participation

Out-of-class Assignments

literature review of scientific journal articles

Demonstration of Critical Thinking

Case study review and development of solutions to environmental problems using scientific data

Required Writing, Problem Solving, Skills Demonstration

short answer and essay questions

Eligible Disciplines

Biological sciences: Masters degree in any biological science OR bachelors degree in any biological science AND masters degree in biochemistry, biophysics, or marine science OR the equivalent. Masters degree required. Chemistry: Masters degree in chemistry OR bachelors degree in chemistry or biochemistry AND masters degree in biochemistry, chemical engineering, chemical physics, physics, molecular biology, or geochemistry OR the equivalent. Masters degree required. Ecology: Masters degree in ecology or environmental studies OR the equivalent OR see interdisciplinary studies. Masters degree required. Physical sciences: See interdisciplinary studies Masters degree required.

Textbooks Resources

1. Required Zehnder, C.; Manoylov, K.; Mutiti, S.; Mutiti, C., VandeVoort, A., and Bennett, D. Introduction to Environmental Science, 2nd ed. Biological Sciences Open Textbooks., 2018

Other Resources

1. Coastline Library