

FLCC Course Syllabus

General Information

Date

11/07/2016

Department

Environmental Conservation & Horticulture

Course Prefix:

BIO/CON

Course Number:

103

Course Title:

Environmental Science

Course Information

Credit Hours

4

Lecture Contact Hours

3

Laboratory Contact Hours

2

Catalog Description

This course investigates the interactions and relationships between humans and the Earth. It provides the scientific foundation for analyzing today's pressing environment issues and solutions for a sustainable future. Students will gain an understanding and appreciation of the impact of humans on other living organisms, water, air, soil, fossil fuels, and mineral resources. In analyzing potential solutions to these environmental issues, students will evaluate the impact of their own choices on the Earth's resources as well as the relative role of governments in setting sustainable policies. In the laboratory component of the course, students will learn scientific methodology, sampling procedures and methods used to test environmental quality. A portion of the lab will include outdoor experiences.

Grading Scheme

Letter Grade

FLCC Values

College Learning Outcomes Addressed by the Course

Inquiry
Interconnectedness
Vitality
Perseverance

Course Learning Outcomes

Course Learning Outcomes

- 1 : Describe basic scientific concepts critical to the study of environmental science.
- 2 : Conduct standard environmental science tests (e.g. water, soil, and air quality tests) incorporating best practice laboratory skills (e.g. attention to detail, precise mathematical calculations, concise writing).
- 3 : Formulate science-based positions on contemporary environmental issues considering multiple standpoints.
- 4 : Evaluate changes (personal, commercial, and governmental) that would enhance personal and societal wellness and global sustainability.

Program Affiliation

This course is required as a core program course in the following program(s)

AS Environmental Studies
AAS Fish and Wildlife Technology
AAS Horticulture
AAS Natural Resources Conservation
Natural Resources Conservation Certificate
AAS Natural Resource Conservation: Law Enforcement

Outline of Topics Covered

Outline of Topics Covered

- I. Basic science fundamentals
 - ∞ Matter (forms, structures, and laws)
 - ∞ Energy (forms, quality, and laws)
 - ∞ Carbon, phosphorous, nitrogen cycle
 - ∞ Basic ecology principals (hierarchy of ecology, species concepts, environmental optimums, population dynamics, community interactions, trophic dynamics)
- II. Biodiversity
 - ∞ Value of biodiversity
 - ∞ Threats to biodiversity and ecosystem services
 - ∞ Solutions for sustaining biodiversity
- III. Water consumption and pollution
 - ∞ Water's physical and chemical properties
 - ∞ Hydrologic cycle
 - ∞ Supply, use, and renewal
 - ∞ Impacts of too much and too little
 - ∞ Pollution (organic waste, eutrophication, pathogen, chemical, sediment)
 - ∞ Water stewardship
- IV. Soils
 - ∞ Soils and plants
 - ∞ Soil degradation
 - ∞ Soil conservation
- V. Food production/distribution
 - ∞ Human history of food production
 - ∞ Socio-environmental impacts of modern food distribution system (including pest control)
 - ∞ Global inequalities in food distribution
 - ∞ Sustainable alternatives
- VI. Fossil fuels
 - ∞ Formation of fossil fuels and difference between the three major types (coal, oil, gas)
 - ∞ Impacts of extraction, transportation, and combustion of coal, oil and gas
 - ∞ Matching sources to uses (electricity generation/heating/transportation, residential vs. commercial, etc.)
 - ∞ Energy policy and security
- VII. Air pollution
 - ∞ Atmosphere layers and composition
 - ∞ Primary and secondary pollutants
 - ∞ Human and ecosystem health: impacts and solutions

VIII. Climate change

- ↘ Factors that govern global climate patterns
- ↘ Geologic record of climate
- ↘ The greenhouse effect
- ↘ Impacts of climate change
- ↘ Responses to climate change: mitigation and adaptation

IX. Nuclear power

- ↘ How nuclear power works
- ↘ History of nuclear power
- ↘ Evaluation of positive and negative socio-environmental impacts of nuclear energy

X. Renewable energy

- ↘ Different forms (solar, wind, water, geothermal, biomass, etc)
- ↘ Evaluation of positive and negative socio-environmental impacts of each form
- ↘ Reaching a sustainable energy future

XI. Sustainability

- ↘ Unifying root cause of all environmental issues: Population and consumption (case study: Easter Island)
- ↘ Stewardship, sound science, and sustainability
- ↘ What does a sustainable future look like?
- ↘ Solutions that are economically feasible, socially desirable, and ecologically viable solutions
- ↘ Individual responsibility and public policy
- ↘ Local and global communities

Laboratory topics to be covered include, but are not limited to:

- Lab safety and technical writing
- Toxicology - lethal dosage (LD50)
- Standard water quality tests (e.g. field sampling techniques, dissolved oxygen, microorganisms, biotic index-macroinvertebrate sampling)
- Standard soil sample tests (e.g. microorganisms, pH, texture, % organic matter, electric charge, nutrient levels)
- Tour of wastewater treatment plant
- Boat trip on Canandaigua Lake
- Energy consumption using kilowatt meters
- Air pollution calculations
- Analysis of current climate change data and evaluation of potential solutions