

**University of Arkansas – Fort Smith**

**5210 Grand Avenue  
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**General Syllabus**

**BIOL 32084 Conservation and Environmental Science**

Credit Hours: 4

Lecture Hours: 3

Laboratory Hours: 3

Prerequisite: BIOL 10303/10301 General Botany/Laboratory OR BIOL 20003/20001 General Microbiology/Laboratory OR BIOL 10503/10501 General Zoology/Laboratory, CHEM 10003/10001 Chemical Principles/Lab OR CHEM 14103/14101 College Chemistry I/Lab, and MATH 21003 Probability and Statistics.

Effective Catalog: 2018- 2019

**I. Course Information**

**A. Catalog Description**

Examines a variety of biological, chemical and radioactive pollution problems plaguing the modern world. Detrimental effects of pollution on delicate ecosystems are studied intensely. Proper safety precautions and regulations needed to properly handle hazardous materials will be critiqued. Students are exposed to bioremediation and other cleanup measures being implemented today, along with a review of relevant case studies.

**B. Additional Information**

This course will survey major environmental issues and concerns. Case studies will be used to show recent examples of environmental disasters. Conservation biology will be included to demonstrate methods of sustaining a healthy environment. Alternative technologies will be reviewed along with their feasibility, cost, and political ramifications.

**II. Student Learning Outcomes**

**A. Subject Matter**

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

1. Analyze and list several environmental pollution problems in the world today.
2. Evaluate the human activities of the past and present that contribute to environmental pollution.

3. Explain conservation biology techniques that help maintain an environment free from pollution problems.
4. Give examples of alternative technologies that are not damaging to the environment.
5. Define bioremediation and give examples of its usefulness.
6. List agencies and regulations that have developed over the last few decades to combat environmental degradation.

## **B. University Learning Outcomes**

This course enhances student abilities in the following areas:

### **Analytical Skills**

**Critical Thinking Skills:** Students will predict environment effects when normal ecological conditions are altered. Students will assess how environmental issues affect social and political aspects of life.

**Quantitative Reasoning:** Students will interpret diagrams, charts and graphs from the textbook. Students will employ mathematical skills when performing laboratory analyses including QA/QC, precision and accuracy calculations.

### **Communication Skills (written and oral)**

Students will communicate with their lab partners to arrange work assignments for field trips. Students will make a scientific presentation in both oral and poster form.

### **Ethical Decision Making**

Students will conduct themselves in an ethical manner in class and during take home examinations. Ethical issues will be identified as seen in current events such as human population control efforts and controversial environmental protection organizations.

## **III. Major Course Topics**

- A. Air Pollution
  1. Comparison of primary and secondary pollutants
  2. Solutions for reducing air pollution
- B. Water Pollution: Freshwater and Coastal Marine Environments
  1. Comparison of point source and non-point source pollution
  2. Comparison of lotic and lentic environments
- C. Hydroelectricity
  1. Pros and cons of hydropower
  2. Comparison of renewable and nonrenewable energy resources
- D. Declining natural resources
  1. Habitat destruction
  2. National Park degradation
  3. Tragedy of the commons
- E. Agriculture: Pesticides and Eutrophication
  1. Toxicity of pesticides

2. Alternatives to pesticides
3. Application of fertilizers
4. Methods to reduce cultural eutrophication
- F. Loss of Biodiversity: Endangered species
  1. Natural history and mass extinctions
  2. Threatened and endangered species
  3. Strategies to protect endangered species
- G. Tropical Rain Forests and Desertification
  1. Reasons for deforestation
  2. Effects of deforestation including desertification and erosion
- H. Ozone depletion
  1. Chemistry of ozone depletion
  2. Importance of ozone as a natural sunscreen
- I. Global Warming and Climate Change
  1. Greenhouse gases and the greenhouse effect
  2. Difference between Global warming and other climate change factors
- J. Industrial disasters: Chernobyl and Bhopal
  1. Pros and cons of nuclear energy including the Chernobyl disaster
  2. Pros and cons of chemical plants including the Bhopal disaster
- K. Conservation Strategies
  1. Comparison of conservation and preservation
  2. Methods to conserve natural resources
- L. Alternative Technologies
  1. Renewable energy technologies
  2. Bioremediation technologies
- M. Legislation
  1. Survey of Environmentalist groups
  2. History of famous environmental legislation that has been passed
  3. Discussion of the need for enforcement of environmental laws