

**Section I**

**Course Title:** Environmental Science II

**Course Code:** BIO 104

**Lecture Hours:** 2

**Laboratory Hours:** 4

**Credits:** 4

**Course Description:**

Environmental Science II is the second semester of a two semester study of environmental science. The course, intended for non-majors only, focuses on environmental issues and their effect on planet life. This is a state approved General Education Science course.

**Prerequisite:**

None.

**Co-Requisite:**

MAT 095

**Place in College Curriculum:**

A four-credit science elective for any student except math/science or nursing majors.

**Chapter Outlines:**

**Part IV: Energy**

**Chapter 13 - Energy from Fossil Fuels**

- A. Energy Sources and Uses
- B. Exploitation of Crude Oil
- C. Other Fossil Fuels
- D. Sustainable Energy Options

**Chapter 14 - Nuclear Power**

- A. How Nuclear Power Works
- B. Hazards and Cost of Nuclear Power
- C. Advanced Reactors
- D. The Future of Nuclear Power

**Chapter 15 - Renewable Energy**

- A. Solar Energy
- B. Indirect Solar Energy
- C. Additional Renewable Energy Options

**Part V: Pollution and Prevention**

**Chapter 16 - Environmental Hazards and Human Health**

- A. Links between Human Health and the Environment
- B. Pathways of Risk
- C. Risk Assessment

**Chapter 17 - Pest and Pest Control**

- A. The Need for Pest Control
- B. Chemical Approach
- C. Alternative Methods
- D. Socioeconomic Issues
- E. Public Policy

**Chapter 18 - Water Pollution and Its Prevention**

- A. Water Pollution
- B. Eutrophication
- C. Sewage Management

**Chapter 19 - Municipal Solid Waste**

- A. Solid Waste Problem
- B. Solutions
- C. Public Policy and Waste Management

**Chapter 20 - Hazardous Chemicals**

- A. Toxicology and Chemical Hazards
- B. History of Mismanagement
- C. Cleaning Up the Mess
- D. Management of New Wastes
- E. Looking Toward the Future

**Chapter 21 - The Atmosphere**

- A. Atmosphere and Weather
- B. Climate
- C. Global Climate Change
- D. Depletion of the Ozone Layer

**Chapter 22 - Atmospheric Pollution**

- A. Air Pollution Essentials
- B. Major Air Pollutants
- C. Source of Pollutants
- D. Acid Deposition
- E. Bringing Air Pollution under Control

**Part VI: Toward a Sustainable Future**

**Chapter 23 - Economics, Public Policy, and the Environment**

- A. Economics and Public Policy
- B. Resources and the Wealth of Nations
- C. Pollution and Public Policy
- D. Politics, the Public, and Public Policy

**Chapter 24 - Sustainable Communities and Lifestyles**

- A. Urban Sprawl
- B. Urban Blight
- C. Sustainable Communities

**Course Performance Objective #1:** Discuss energy resources currently available and explain the consequences each can have on the environment.

**Learning Outcomes:**

Students will describe and explain:

1. how all energy use has environmental and social costs.
2. what energy type and energy use should be matched to improve energy efficiency.
3. how fossil fuels are non-renewable resources.
4. how conservation is the energy source with the greatest potential for creating new energy supplies and how it has the least number of environmental costs.
5. how nuclear power plants produce energy.
6. how nuclear power uses fission; the splitting of a uranium-235 atom into two smaller atoms.
7. how radioactive emissions can adversely impact biological systems.
8. what concerns about the use of nuclear power come from the chance of accidents and disposal issues.
9. how solar energy is, for all practical purposes, an inexhaustible energy source.
10. how the difficulties with using solar relate to the desired end uses of energy and the technical issues involved in the conversion of radiant energy to electricity.
11. the sources of available energy that depend upon the sun.
12. how renewable energy can be found in many forms.
13. how we can reduce our impact on the environment.

**Course Performance Objective # 2:** Discuss environmental hazards and the various ways that human activities pollute the land, water and air of this earth. Discuss the choices we have for minimizing our impact on the environment.

**Learning Outcomes:**

Students will describe and explain:

1. how environmental hazards are broadly defined and include cultural, biological physical and chemical hazards.
2. how poverty, personal choices, societal affluence, and economic structure influence an individual's risk of injury, disease or death from an environmental hazard.
3. how risk analysis is based upon a four-step process: hazard assessment, dose-response assessment, exposure assessment and risk characterization.
4. how risk management merges public policy with risk assessment.
5. how risk perception is critical for determining the risks that will be tolerated.
6. how the precautionary principle, long accepted in Europe as a guide for public policy, is gaining ground in the United States.
7. how pests are organisms that compete with humans for food or create annoyances.
8. how pesticide resistance, pest resurgence, and secondary pest outbreak are all consequences of chemical pest control attempts.
9. how chemical pesticides have possible adverse human and environmental consequences.
10. how alternative methods of pest control such as cultural control, control by natural enemies, genetic control and natural chemical control can be effectively used to manage pests.
11. how organic food growers utilize all the methods of integrated pest management except synthetic chemical control.
12. how most water pollution can be described as resources out of place.

13. how water pollutants are pathogenic organisms, chemicals, and substances that alter habitats.
14. the difference between natural eutrophication and cultural eutrophication.
15. how sewage management and treatment, along with sludge treatment, have been extremely effective in the elimination of a variety of forms of pollution.
16. how it is not possible to throw anything away and how the First and Second Laws of Thermodynamics and the Law of Conservation of Energy rule how we use resources and energy.
17. how all organisms produce waste and how to live in a sustainable society, the wastes products must not be hazardous to other organisms.
18. how the greatest quantity of energy and resources conservation is associated with reducing waste followed by reusing and then recycling.
19. the effectiveness of the major types of recycling.
20. how landfills can be operated to decrease leaching of ground and surface water, maximize the production and capture of methane, and increase the rate of settling.
21. how the dose of a chemical will determine its toxicity and how the hazard of a chemical is determined by toxicity and exposure.
22. how a substance is legally defined as hazardous if it is flammable, corrosive, reactive or toxic.
23. how weather and climate are chaos driven phenomena.
24. how gases exist in the troposphere that act to keep heat from leaving the planet.
25. how the dynamic balance between ozone and oxygen in the stratosphere results from the absorption of radiation.
26. how CFCs and other ozone depleting chemicals react with ozone
27. the natural processes that cleanse the atmosphere.
28. how air pollution adversely impacts all living things.
29. how primary and secondary air pollutants are produced.

**Course Performance Objective # 3:** Explain the relationship among economics, public policy and the environment. Explain how personal involvement, lifestyles and values affect our sustainable environmental future.

### **Learning Outcomes:**

Students will describe and explain:

1. how public policy governs society's interactions with the environment through laws and regulations.
2. how a nation's wealth is dependent upon produced assets, natural capital and human resources.
3. how public policy development has a life cycle consisting of four stages: recognition, formulation, implementation, and control.
4. how the jobs versus environment dichotomy is false.
5. how environmental public policy has created a cleaner, healthier and more enjoyable environment.
6. how society decides how policies are made.
7. how urban sprawl was made possible by the automobile and high-speed highways.
8. how urban sprawl and blight are flip sides of the same coin.
9. how urban sprawl creates new environmental problems or makes existing ones worse.
10. how addressing the problems of urban decay creates livable cities.

**Course Activities:**

Lecture, class participation, lab, debates and projects are the major means of instruction. Videos, overhead transparencies, and Internet activities (IL) are used in instruction. Appropriate community service projects are integrated into the course where possible.

**Course Requirements and Means of Evaluation:**

Please refer to the instructor's syllabus addendum (to be distributed in class) for specific information regarding the course requirements and means of evaluation.

**Attendance Policy:**

Regular and prompt attendance in all classes is expected of students. Students absent from class for any reason are responsible for making up any missed work. Faculty members establish an attendance policy for each course and it is the student's responsibility to honor and comply with that policy.

Academic Honesty Policy:

**Academic Honesty Policy:**

Students found to have committed an act of academic dishonesty may be subject to failure of this course, academic probation, and / or suspension from the college. See the Student Handbook for additional details.

**ADA Statement:**

If you have a 504 Accommodation Plan, please discuss it with your instructor. If you have any disability but have not documented it with the Disability Support coordinator at Salem Community college, you must do so to be eligible for accommodations. To contact the Disability Support Coordinator, call 856-351-2773, or email [disabilitysupport@salemcc.edu](mailto:disabilitysupport@salemcc.edu) to set up an appointment. To find out more information about disability support services at Salem Community College, visit [www.salemcc.edu/students/student-success-programs/disability-support](http://www.salemcc.edu/students/student-success-programs/disability-support).

**Required Texts:**

Please visit Salem Community College Bookstore for textbook information

**Optional Texts:** None

**Material/ Supplies:** None