

Mercer County Community College

Course Outline (revised Spring 2008)

BIO 114
Course Number

Environmental Science Concepts
Course Title

Science and Allied Health Division

3
Credits

3
Class Hours/Week

REQUIRED TEXT:

Title: *VISUALIZING ENVIRONMENTAL SCIENCE*
Author: Linda R. Berg / Mary Catherine Hager
Publisher: Wiley
ISBN: 978-0-471-69702-2

CATALOG DESCRIPTION:

Survey of fundamental concepts of environmental science focusing on the environment and aquatic and terrestrial ecosystems. Topics include the biological and chemical principles that relate to current environmental issues, conservation of plants and animals, energy flow as well as nutrient cycling, basic ecological and technological concerns and advances, and scientific analysis and solutions to environmental problems.

PREREQUISITES: ENG 024, or equivalent proficiency

Course Coordinator: Senior Assistant Professor, Renee Nerish

Course Instructor: Senior Assistant Professor, Renee Nerish

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Office: MS 120

BIO 114 COURSE OUTLINE

Philosophy of Environmental Science Concepts:

Science concept courses are intended to provide a broad and useful introduction to various science areas for students not majoring in science or technology.

Environmental Science Concepts is designed to stimulate your interest in environmental science, to make you more aware of biological and chemical environmental problems, both past and present, and to improve your understanding of the complexity of the environmental issues we face in our daily lives. Factual material will be presented with considerable discussion of technological, biological and chemical developments, political and ethical concerns, as well as sociological consequences of topics considered. It is hoped that by exploring the causes, current status, alternatives and the consequences of alternative solutions to our environmental problems will provide you with an environmental awareness that could be applied toward sensible citizen involvement and a more rational decision making process.

Examinations:

All examinations will be given in class. **You must take the exams at the time scheduled.** Exams will be administered in accordance with the Topical Outline in the Course Outline.

The exams may be taken **one time only** and there will be no make-up dates for these exams. It is your responsibility to be present to take and complete all exams.

An absence will constitute a zero score on any exam. If you have an excused absence, it is imperative that I am contacted on the same day, (prior to the exam) of the missed scheduled exam or earlier.

Questions on the exam will be taken from the reading assignments (including diagrams), handouts, and class notes. Questions will also be included from any films shown or laboratory experiments done during the semester.

Grading Procedure:

Final grades will be determined and based on your **total overall average of points**. All exams, research papers, class attendance, and participation in class discussion will contribute to the total number of possible points available to be earned during the semester. Grades will be based on the point system indicated below.

Overall Average	Grade
93 – 100 %	A
90 – 92	A-
87 – 89	B+
83 – 86 %	B
80 – 82	B-
77 – 79	C+
70 – 76 %	C
60 – 69 %	D
59% and below	F

Extra Credit assignments will be at the discretion of the instructor.

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Attendance:

Attendance at all lectures is expected. To be successful in this course you should plan to attend all lectures. If you should miss a lecture for any reason, it is **your responsibility** to obtain the missed information including: course material covered, any announcements made, as well as any handouts that have been distributed in class.

Classroom Conduct:

It is the students' responsibility to attend all of their classes. If you miss a class meeting for any reason, you are responsible for all content that is covered, for announcements made in your absence, and for acquiring any materials that may have been distributed in class. (These may be picked up in my office, MS 120, during office hours or you may check outside of MS 120 in the plastic holder.) It is expected that you be on time for all of your classes. If you walk into a class after it has begun; it is expected that you choose a seat close to where you entered the room so that you do not disrupt the class meeting.

You are expected to follow ordinary rules of courtesy during class sessions. Engaging in private, side conversations during class time is distracting to other students and to the instructor. Leaving class early without having informed the instructor is not acceptable behavior. Disruptive behavior of any type, including sharpening pencils during class while someone is speaking, **cell phones**, (unless an emergency) **and beepers are not appropriate**. Cell phones and beepers ringing will **NOT** be tolerated in class. Please be sure to turn the sound off prior to entering class. They are disruptive to your fellow classmates as well as to the instructor.

As you can see, simple norms of courtesy should be sufficient to have our class run in the best interest of all of us.

Performance Objectives:

1. You are expected to attend all class meetings.
2. You are expected to participate in class discussions. Opinions are neither right nor wrong, they are opinions!
3. You must complete and take all exams at the time scheduled.
4. You must hand in your opinion papers at the time scheduled.
5. You must demonstrate proficiency in the subject matter by mastering a large part of material covered by the lectures, class discussion, films and the reading assignments from your textbook.
6. You will be given outlines and handouts specific for each topic. You are responsible for all handouts given in class.

BIO 114 TOPICAL OUTLINE

Chapter 1: The Environmental Dilemmas We Face

- A. World in Crisis
- B. Sustainability and Earth's Capacity to Support Humans
- C. How We Handle Environmental Problems

Pages: 2 – 21

Chapter 2: Environmental Sustainability and Human Values

- A. Human Use of Earth
- B. Human Values and Environmental Problems
- C. Environmental Justice
- D. An Overall Plan for Sustainable Living

Pages: 24 – 42

EXAM 1 **Chapters 1 & 2**

Chapter 5: How Ecosystems Work

- A. What is Ecology?
- B. The Flow of Energy Through Ecosystems
- C. The Cycling of Matter Through Ecosystems
- D. Ecological Niches
- E. Interactions Among Organisms

Pages: 94 – 120

Chapter 6: Ecosystems and Evolution

- A. Earth's Major Biomes
- B. Aquatic Ecosystems
- C. Population Responses to Changing Conditions over Time: Evolution

Pages: 124 – 150

EXAM 2 **Chapters 5 & 6**

BIO 114 TOPICAL OUTLINE

Chapter 7: Human Population Change and the Environment

- A. Population Ecology
- B. Human Population Patterns
- C. Demographics of Countries
- D. Stabilizing World Population
- E. Population and Urbanization

Pages: 154 – 180

Chapter 4: Risk Analysis and Environmental Hazards

- A. A Perspective on Risks
- B. Environmental Hazards
- C. Movement and Fate of Toxins
- D. How We Determine the Health Effects of Pollutants
- E. Precautionary Principle

Pages: 70 – 90

Chapter 16: Solid and Hazardous Waste: An Unrecognized Resource

- A. Solid Waste
- B. Reducing Solid Waste
- C. Hazardous Waste
- D. Managing Hazardous Waste

Pages: 384 - 403

EXAM 3

Chapters 7, 4, and 16

Chapter 8: Air and Air Pollution

- A. The Atmosphere
- B. Types and Sources of Air Pollution
- C. Effects of Air Pollution
- D. Controlling Air Pollutants
- E. Indoor Air Pollution

Pages: 184 – 206

BIO 114 TOPICAL OUTLINE

Chapter 9: Global Atmospheric Changes

- A. The Atmosphere and Climate
- B. Global Warming
- C. Ozone Depletion in the Stratosphere
- D. Acid Deposition

Pages: 210 – 230

EXAM 4 **Chapters 8 & 9**

Chapter 10: Freshwater Resources and Water Pollution

- A. The Importance of Water
- B. Water Resource Problems
- C. Water Management
- D. Water Pollution
- E. Improving Water Quality

Pages: 234 – 258

Chapter 14: Agriculture and Food Resources

- A. World Food Problems
- B. The Principle Types of Agriculture
- C. Challenges of Agriculture
- D. Solutions to Agricultural Problems
- E. Controlling Agricultural Pests

Pages: 336 – 357

EXAM 5 **Chapters 10 & 14**

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Chapter 17: Nonrenewable Energy Resources

- A. Energy Consumption
- B. Coal
- C. Oil and Natural Gas
- D. Nuclear Energy
- E. Decommissioning Nuclear Power Plants

Pages: 406 – 425

Chapter 18: Renewable Energy Resources

- A. Direct Solar Energy
- B. Indirect Solar Energy
- C. Other Renewable Energy Sources
- D. Energy Solutions: Conservation and Efficiency

Pages: 428 - 449

EXAM 6

Chapters 17 & 18

There is NO cumulative exam for BIO 114.

TEST SCORES:

Total points for tests and papers = 600 (700) points.

Test #1: _____

Test #2: _____

Test #3: _____

Test #4: _____

Test #5 _____

Test #6 _____

Papers: _____

Total Points = _____

Total points divided by 6 (7) = _____

Extra Credit points = _____

Total points earned = _____

BIO 114

WRITTEN ASSIGNMENTS

You are to choose **ONE** question from each of the five units. Each written assignment will be 2 to 3 double-spaced, typed pages. Fonts will be **NO** larger than 12 and margins will be no larger than 1 inch. The writing assignment is to express **YOUR** viewpoint on the questions that you choose. **NO** research is required for the written assignment. If you choose to research a topic, to emphasize your viewpoint, you **MUST** site the research source within the content of your paper. Due dates for the written assignments will be given at the start of each semester.

QUESTIONS FOR WRITTEN ASSIGNMENT 1

1. Technology is central to the environmental crisis. What do you feel should be done to make technology work for us, instead of undermining our future?
2. Do you feel that the world has enough resources for 8 to 10 billion people to live decent, secure, happy, and fulfilling lives? What do those terms mean to you? What do you think that they mean to people living in less developed countries?
3. What one person do you believe has made the greatest and longest-lasting contribution to the conservation and environmental movements in the United States?
4. Do you believe that law should require energy conservation? How would you feel if electricity was rationed and you could only use a certain number of kilowatt-hours of electrical power each month?
5. Do you believe that human beings, as only one species among the millions sharing the ecosystems on earth, are morally justified in altering ecosystems for their own purposes and thereby consigning other species to extinction?
6. Would you support legislation banning further industrial development in your city, county or state? Why or why not?

QUESTIONS FOR WRITTEN ASSIGNMENT 2

2. Even before humans entered the scene, many species of plants and animals were extinct and new ones had developed. Why are we concerned about endangered species given the fact that species have always come and gone?
3. Charles Darwin's "Theory of Evolution" is controversial. Scientists believe in this theory and theologians do not. What is your opinion about the "Theory of Evolution"?
4. Do you believe that the introduction of exotic (non-native) species into an ecosystem is an environmentally sound practice? Can you identify circumstances under which it would be justified, even if a non-native species causes integrity (e.g., the disappearance of one or more native species) of an ecosystem?

QUESTIONS FOR WRITTEN ASSIGNMENT 2 (continued)

5. You are a forest ecologist living and working in a logging community. An endangered salamander has recently been discovered in your area. What arguments would you make for and against adding the salamander to the official endangered species list?
6. In which biome do you live? What environmental factors help make this a biome. What is the current health of your biome? What are the current threats to your biome? How do you think your biome looked 100 years ago? How do you think it will look in 100 years?
7. Scientists have begun using gene-transfer techniques to clone some endangered species as a way to help prevent extinction. They have also used gene-transfer techniques to clone sheep (remember Dolly). How do you feel about gene-transfer techniques? Would you want to be cloned?

QUESTIONS FOR WRITTEN ASSIGNMENT 3

1. The People's Republic of China, with about 20% of the world's population, has carried out population control measures that, from the evidence, have sometimes involved coercion. Do you believe government coercion in population control is ever justified? If so, to what extent would you accept such coercive measures by your own state or national government?
2. The United Nations appoints you as head of family planning programs. Your first assignment is to devise a family planning program for less developed countries with rapid population growth, high illiteracy, and widespread poverty. How would you do this? What problems might you expect to encounter?
3. Do you think that the United States should increase or decrease the number of legal immigrants? Explain your answer.
4. Are good health and a clean environment a basic human right, or merely something that we should all strive for? Would you be willing to pay a separate tax for a cleaner environment?
5. Why do you think that some carcinogenic agents, like those in cigarettes, are so difficult to regulate? Would you regulate smoking more than they are currently being regulated? How would you change the regulations?
6. Looking at your own life, what kinds of risks do you take? What kinds would you be unwilling to take? What criteria do you use to make a decision about acceptable and unacceptable risk?

QUESTIONS FOR WRITTEN ASSIGNMENT 4

1. If no suitable substitutes for chlorofluorocarbons were available for use in air conditioning equipment, would you be willing to do without air conditioning in your car, home or workplace? (think of this past summer with temperatures of over 100⁰ C)
2. Do you agree with a ban on smoking, (California, NYC and NJ), including **all** indoor

public places, even privately owned restaurants, bars, and casinos?

QUESTIONS FOR WRITTEN ASSIGNMENT 4 (continued)

3. There are many problems with the Kyoto Protocol. President George W. Bush does not agree with the Protocol and therefore refuses to sign the treaty. Do you agree or disagree with President Bush's position?
4. How can you help save freshwater in your daily life? Would the savings be worth the costs?
5. How do you feel that human activities contribute to flooding and flood damage? How do you think that these effects can be reduced?
7. Do you think that water pollution is worse now than it was in the past? Why do you feel this way? How do your personal experiences influence your opinion?

QUESTIONS FOR WRITTEN ASSIGNMENT 5

1. Do you believe that laws should require manufacture's of automobiles sold in the United States to produce vehicles that achieve 50 miles per gallon of gasoline? Is it possible for automobile manufacture's to produce such an automobile?
2. Nuclear generation of electricity does not release greenhouse gases into the atmosphere. Do you believe all coal and oil- burning generating plants should be replaced by nuclear – powered generating facilities?
3. Do you believe that every person of a family who can afford several automobiles should be able to license all of them at the same low rate as the first, or should successive cars be penalized with higher license fees?
4. What values do you think are revealed by ownership of an eight-cylinder automobile that travel only ten to twelve miles per gallon of gasoline?
5. Why do you think that consumers are so quick to adapt the "use it once, then throw it away" lifestyle? What values, beliefs and/or perceptions does this attitude reveal about the consumer?
6. Do you think that it is possible to have a high standard of living, as in North America and Western Europe, and not produce large amounts of solid waste? How would this be accomplished?

PLEASE VARY THE TOPICS THAT YOU CHOOSE. MANY OF THE TOPICS FOR THE WRITTEN ASSIGNMENT ARE SIMILAR