

Course Outline
ECON 193
Environmental and Natural Resource Economics
3 semester Hours

The Community College of Baltimore County

Description

Economic principles are used to analyze pollution and natural resource problems, and to evaluate policies that address them. Important theoretical issues such as sustainable development and the allocation of non-renewable resources to future generations are informed by ecological and ethical considerations. Topics include renewable and exhaustible energy resources, water scarcity, overharvesting of fisheries and forests, recyclable resources, population growth, causes and consequences of air and water pollution, and innovative approaches to dealing with environmental problems. Emphasis is placed on assessing the efficiency and fairness of policy alternatives, and recognizing the inconsistency between those two values.

Prerequisites: Reading Skill 2; English Skill 2; Math Skill 1.

Overall Course Objectives

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

1. Distinguish between physical limits and economic scarcity. (I; 1, 2, 3)
2. Apply the concept of economic scarcity to the case of natural resources and various indicators of emerging resource scarcity. (I; 1, 2, 3)
3. Contrast economists' utilitarian interpretation of natural resources with the view that the economy is part of the natural ecosystem, subject to ecological limits. (I, V; 1, 2, 3)
4. Differentiate natural resources in terms of renewability, recyclability and storability. (I; 1, 2)
5. Describe the current state of selected natural resources in terms of stocks, reserves, global distribution, economic value, ownership patterns, ecosystem significance and rate of consumption or depletion. (I, IV, VI; 1, 2, 3)
6. Explain the role of markets in allocating scarce resources, and assess market outcomes in terms of efficiency and equity criteria.. (I, V; 1, 2)
7. Analyze the causes of natural resource problems in terms of perverse incentives, market failures and government failures. (I, V; 1, 2)
8. Relate the treatment of natural resources to patterns of ownership-rights (private property, common property, and open-access). (I, V; 1, 2)

9. Analyze the problem of allocating resources across generations in terms of user cost, economic rent, present value, and discount rate. (I, III, V; 1, 2)
10. Critically review definitions of sustainability and sustainable development. (I, IV, V, VI; 1, 2)
11. Compare and contrast different positions in the scientific debate concerning population growth, economic growth, sustainable development, and biophysical limits. (I, II, V; 1, 2)
12. Explain theoretical issues in the valuation of environmental resources and apply empirical methods of valuation. (I, V; 1, 2)
13. Assess market-based, command-and-control, and other policy approaches for managing, allocating, and conserving selected natural resources. (I, V; 1, 2)
14. In collaboration with other students, analyze a case study of a natural resource problem, and formulate and justify policy recommendations. (II, III, IV, V, VI; 2, 3, 4)
15. Summarize the economic, health, and environmental effects of major categories of pollution (including global warming). (I, IV, VI; 1, 2, 3)
16. Summarize the major sources and global distribution of mobile and point sources of air pollution. (I, IV, VI; 1, 2, 3)
17. Analyze the optimal quantity of pollution in terms of marginal benefits and costs and Pareto-optimal efficiency. (I, V; 1, 2)
18. Analyze the causes of pollution in terms of perverse incentives, market failure (negative externality) and government failures. (I, V; 1, 2)
19. Evaluate command-and-control, and innovative approaches to pollution control in terms of economic efficiency, fairness, liberty and other values. (I, V; 1, 2)
20. In collaboration with other students, analyze a case study of a pollution problem, and formulate and justify policy recommendations. (II, III, IV, V, VI; 2, 3, 4).

Major Topics

A. Introduction

1. Relationship between the economic system and the environment.
2. Definition and taxonomy of resources
 - a. Factors of production and "natural capital"
 - b. Renewability, storability, recyclability.
 - c. Reserves
3. Indicators of emerging resource scarcity and overview of current status of world resources.
4. Population, poverty, economic growth, and resource consumption.

B. Valuing environmental resources

1. Marginal analysis and optimal outcomes (Case study*: surface water in the West)

2. Market valuation and static efficiency (Case study: allocating water to agriculture and cities)
3. Methods of valuation (Case study: wetlands)

C. Property rights and market failures

1. Common-property and open access resources (Case study: oyster harvests)
2. Externalities (Case study: energy and global warming)
3. Public goods

D. Defining Sustainable Development

1. Biophysical laws, ecosystem fundamentals, and ecological limits.
2. Dynamic Efficiency (Case study: allocating non-renewable energy resources over time)
3. Reconciling efficiency and intergenerational equity

E. Applying normative economics to the analysis and solution of natural resource problems.

1. Energy.
2. Ground and surface water.
3. Forests.
4. Fisheries.
5. Recyclable resources.

F. The prospects for sustainable growth

1. The range of probable scenarios.
2. Elimination of perverse incentives.
3. The role of market allocations.
 - a. Full-cost pricing
 - b. Property rights
 - c. Cost-effectiveness
4. Information and democratic participation
5. Trade and international cooperation
6. Population stabilization

G. Introduction to environmental pollution

1. Description and taxonomy of pollutants
 - a. Stock pollutants
 - b. Fund Pollutants
2. The economics of pollution
 - a. Overview of pollution costs
 - b. Externalities and market efficiency
 - c. The efficient quantity of pollution
 - d. Cost-effective policies

H. Air pollution

1. Local point-sources
 - a. Clean Air Act (1970): command and control policy
 - b. New approaches to pollution control
 - 1). Transferable permits and emissions trading
 - 2). Reduction credits
 - 3). Emission charges
 - 4). Evaluation of approaches

2. Global pollution: Ozone depletion and Global Warming
3. Vehicular pollution

I. Water Pollution

1. Nature and source of the problem
 - a. Ground water and deep aquifers
 - b. Oceans
 - c. Rivers, lakes and streams
2. Control policies

J. Toxic waste

1. Nature and health effects of the problem
2. Efficiency and cost-effectiveness of remedies
 - a. Regulatory acts and agencies
 - b. Civil law
 - c. Criminal law

* Case studies are illustrative only. The instructor has the discretion to select appropriate case studies.

Course Requirements (VII)

Evaluations of student progress will be evenly spaced over the course of a semester, culminating in at least four independent measures of student performance (other than attendance and class participation). Specific assignments and procedures for evaluating student performance will be determined by the individual faculty member, but will include the following:

1. At least two proctored tests or exams.
2. One or more writing assignments that total at least 1500 words.
3. At least one collaborative learning assignment.

At least 300 pages of reading will be assigned. Readings associated with a research paper may be counted toward this requirement.

Instructors will give assignments that utilize modern information technologies in at least one of the following forms: on-line databases for research; e-mail and bulletin boards for collaborative learning; computer simulations; Excel spreadsheets and graphing for problem solving; and Web-based materials and resources.

Other Course Information