

Environmental Economics and Natural Resource Management

Instructor: Dr. Zinnia Mukherjee

Course number: Econ S225E

School: Summer Session B, June 30 – August 1, 2025

Term: Summer 2025

Class time: Tu Th 9:00 – 12:15

Classroom: Online

Office Hours: By appointment on Zoom. Please email me to set an appointment.

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Course Description:

This undergraduate course introduces students to the economics of environmental protection and management of natural resources, and various topics in this area of study.

Is climate change real or a myth? How much would you pay to protect tigers from poachers? How can governments protect the world's marine reserves or regulate energy markets? Can we prevent the killing of dolphins resulting from tuna fishing? What are the environmental effects of economic growth and international trade? These are some of the questions we will be addressing in this course.

The course will begin with an overview of relevant economic concepts such as cost-benefit analysis, efficiency, market failure, externalities, and public goods. Using a basic pollution model, the course will demonstrate the impact of economic activities on local and global environmental outcomes and teach students how economists analyze alternative policy options for reducing environmental damages that stem from human activities. Course topics include management of nonrenewable and renewable natural resources, open access resources and tragedy of the commons, methods of valuing ecosystems, and the relationship between trade and global environmental problems, and global climate policy.

Prerequisites: An introductory course in microeconomics. Students should be familiar with basic economics concepts and topics such as opportunity costs, marginal analysis, and market equilibrium. In addition, students should be comfortable working with linear equations and two variable functions. Calculus is not used, but proficiency with college algebra is essential. No prior familiarity with environmental issues is required.

Reference textbooks:

There is no required textbook for this course. I will provide some lecture notes. The articles I use will be made available to students as PDF files. In addition, the books listed below are a few suggested texts.

Jonathan M. Harris and Brian Roach, *Environmental and Natural Resource Economics – A Contemporary Approach*, 5th edition.

Environmental & Natural Resource Economics (11th edition) by Tom Tietenberg and Lynne Lewis.

Thomas A. Easton, *Taking Sides: Clashing Views on Environmental Issues*, 16th edition, McGraw-Hill, 2014.

Assignments & Grading Policy:

A student's performance in this course will be evaluated based on the following grading policy

Homework Sets (2)	20%
Quizzes 1 & 2	20%
Exam 1	25%
Exam 2	30%
Class Participation	5%

Exams: Exams 1 and 2 will be closed book and closed notes timed exams held online on the exam day. These exams will include numerical problems on the topics covered in class. At least one exam will include a short analytical essay on a course-related topic. A few prompts will be given to help students to develop their essays. **No make-up exams** will be given unless the circumstances are exceptional, for example, a medical emergency. In that event, some documentation will be needed.

Homework Sets: They will include numerical problems, multiple-choice questions, and short answer (few sentences) questions. Students will have about 5-6 days to complete each homework assignment. Late submissions can be penalized.

Quizzes: The two online quizzes (45 minutes) will include a variety of content-based short answer questions.

Attendance Policy: Attendance is mandatory. In this online course, students are expected to attend class sessions on a computer with their video on and in a setting conducive to academic work and class participation. Watching asynchronous recordings, if available, does not fulfill the attendance requirement. If a student cannot attend a particular class session due to an emergency or serious illness, they should let me know in advance, if at all possible, or as soon as possible thereafter.

Academic Integrity: Academic integrity is a core university value that ensures respect for the academic reputation of the University, its students, faculty and staff, and the degrees it confers. While peer study groups are encouraged, students are complete their own assignments and respect the intellectual work of others. Every student is responsible for ensuring he or she is fully aware of what constitutes as intellectually honest work on every assignment and exam in this course. Please ask about my expectations regarding permissible or encouraged forms of student collaboration if they are unclear.

Statement on Artificial Intelligence: Before collaborating with an AI chatbot on your work for this course, please request permission by sending me a note that describes (a) how you intend to use the tool and (b) how using it will enhance your learning. Any use of AI to complete an assignment must be acknowledged in a citation that includes the prompt you submitted to the bot, the date of access, and the URL of the program.

Disability Statement: In compliance with the American Disability Act of 1990 (ADA) and with Section 504 of the Rehabilitation Act of 1973, Yale College is committed to ensuring educational parity and accommodations for all students with documented disabilities and/or medical conditions. It is recommended that all students with documented disabilities (Emotional, Medical, Physical, and/or Learning) consult the Office of Accessibility, to secure necessary academic accommodations. For further information and assistance, please contact the Yale Summer Session.

Course Schedule

* Note this schedule is tentative and depends on our daily progress. Exam dates will not change. However, if we are unable to complete a topic on a scheduled day, we will complete the discussion on the following day.

Meeting Days	Lecture topics, readings, and assignments
July 1 (Tu)	<ul style="list-style-type: none"> ▪ Introduction to the course, discussion of syllabus, and clarification of course expectations ▪ Lecture topics: Review of the core principles of economics How do markets work? The Forces of Market Demand and Supply Elasticities of Demand and Supply Partial vs. General Equilibrium Analysis <i>Practice problem session</i>
July 3 (Th)	<ul style="list-style-type: none"> ▪ Lecture topics: Introduction to Welfare Economics Normative vs. Positive Analysis Efficiency & Equality Market Efficiency – Economics Concepts Sources of Market Failures Markets as a source of Local and Global Environmental Issues <i>Practice Problem session</i>
July 8 (Tu)	<ul style="list-style-type: none"> ▪ Lecture – The Economic Theory of Environmental Externalities ▪ Reading materials: Lecture Notes, Coase (1960), and Leape (2006), chapter 3 Harris and Roach (H&R) <i>Practice problem session</i>
July 10 (Th)	<ul style="list-style-type: none"> ▪ Lecture topic – The Economics of Pollution Control and the Role of Environmental Policies ▪ Policy discussion: Montreal Protocol ▪ Reading material: lecture notes, chapter 8, H&R, and Murdoch and Sandler (1997) ▪ <i>Practice problem session</i> ▪ Exam 1 review
July 12 – 13	<ul style="list-style-type: none"> ▪ Homework 1 due (Sat) and Online 45 minutes – Quiz 1 (Sun)
July 15 (Tu)	<ul style="list-style-type: none"> ▪ EXAM 1
July 17 (Th)	<ul style="list-style-type: none"> ▪ Lecture topic – International Trade and the Environment ▪ Reading: chapter 21 (H&R) and lecture notes ▪ <i>Practice problem session</i>
July 22 (Tu)	<ul style="list-style-type: none"> ▪ Lecture topics – Markets for Nonrenewable Resources ▪ Reference: chapters 5 and 17 (H&R) and class notes ▪ <i>Practice problem session</i>
July 24 (Th)	<ul style="list-style-type: none"> ▪ Lecture topics: Renewable Resource Management Open Access and the Tragedy of the Commons ▪ References: chapters 18-19 (H&R), Heal and Schlenker (2008) and Stavins (2011) ▪ <i>Practice problem session</i>
July 26 – 27	<ul style="list-style-type: none"> ▪ Homework 2 (Sat) and Online 45 minutes – Quiz 2 (Sun)
July 29 (Tu)	<ul style="list-style-type: none"> ▪ Lecture topic – Valuing the Environment: Concepts and Methods Economics of Ecosystem Services ▪ Exam 2 review
July 31 (Th)	<ul style="list-style-type: none"> ▪ EXAM 2

Papers:

Aldy, Joseph. (2005). An Environmental Kuznets Curve Analysis of U.S. State-Level Carbon Dioxide Emissions. *Journal of Environment & Development*, Vol. 14, No. 1, Special Issue: Socioeconomic Drivers of Greenhouse Gas Emissions, pp. 48 – 72.

Coase, Ronald. (1960). The Problem of Social Cost. *The Journal of Law & Economics*, 3, 1-44.

Heal, Geoffrey and Wolfram Schlenker, “Sustainable Fisheries,” *Nature*, Vol.455/23, October 2008.

Keiser, David. A., and Joseph S. Shapiro. (2017). Consequences of the Clean Water Act and the Demand for Water Quality. National Bureau of Economic Research, Inc, *NBER Working Papers*: 23070, 2017.

Leape, Jonathan. (2006). The London Congestion Charge. *Journal of Economic Perspectives*, Vol. 20, No. 4, 157-176.

Miller, Steve J., and Robert T. Deacon. (2017). Protecting Marine Ecosystems: Regulation versus Market Incentives. *Marine Resource Economics*, Vol.32, No.1, pp 83-107.

Murdoch, James C. and Todd Sandler. (1997) The Voluntary Provision of a Pure Public Good: The Case of Reduced CFC Emissions and the Montreal Protocol. *Journal of Public Economics*, Vol.63(3), 331-349.

Ross, Martin T. and Brian C. Murray. (2016). What is the Fuel of the Future? Prospects under the Clean Power Plan. *Energy Economics*, Vol.60, 451-59.

Stavins, Robert (2011). The Problem of the Commons: Still Unsettled after 100 Years. *American Economic Review*, Vol.101, 81 – 108.