ESM 204: Economics for Environmental Management
Bren School, UC Santa Barbara

Winter 2025

Class: Monday/Wednesday, 8-9am, 1414 Bren. Course webpage: **Canvas**

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Instructor Office Hours: Mondays, 3:00-4:00

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Introduction. In this class, we examine the incentives and rationale behind environmental problem solving. Broadly speaking, economics is the science of how resources in a society are allocated. For environmental issues, this speaks directly to why pollution is created, how natural resources are used, and how society can address environmental challenges. Many environmental problems are caused by economic activity (e.g., carbon emissions, overharvesting renewable resources) and have differentiated effects on diverse populations (e.g., the global poor are most vulnerable to climate change, air pollution exposure in the US disproportionately affects minority communities). This course will examine different approaches to influencing human behavior and the unequal implications of those interventions.

The purpose of the course is to give you a solid foundation in those aspects of economics and quantitative policy analysis that are important to environmental and natural resource management and policy. A major goal of the course is to equip students to think carefully and constructively about how different kinds of policies or interventions could affect environmental outcomes and human wellbeing. The course will serve as the foundation in economics for management, economics, and policy electives in the Bren School.

There will be readings prior to some class meetings and homework assignments (projects) due about every other week. There will be a total of 4 assignments. The course website will contain all details for these assignments.

Grading. The course requirements are a midterm (20%), final exam (20%), four homework assignments (40%), and an essay, including a peer-reviewed proposal (20%). The midterm will be in-class and the final will be held during the last day of class. The essay is due during finals

week. The exams are open note and open book. Class attendance is mandatory; if you have to miss class, you must obtain approval prior to the start of class. We will be doing randomly timed in-class ungraded quizzes to take attendance. If you miss a class without prior approval, your grade will be reduced by 5%. If you are sick, please let us know before class starts that you will miss class. Late work will receive a zero unless you obtain prior approval.

Lectures. Lecture slides will be available prior to the lecture on Canvas. These slides are often intentionally brief. We will regularly use the white board to explain concepts so you will likely want to take notes.

Readings. Because class content and homework assignments are highly involved, we limit required readings in this course. You are not required to purchase any particular textbook. However, you are responsible for learning the material covered in class. In many cases, you will need to do outside reading to fully grasp the material covered in class. You are expected to be able to seek out that material on your own, although we are happy to help guide you. Two good all-around environmental economics textbooks we recommend are:

- *Markets and the Environment* (by Nathanial Keohane and Sheila Olmstead), available online via UCSB Library
- *Environmental Economics* (2nd Edition) by Charles Kolstad, available in the UCSB Library

Other readings (such as newspaper or journal articles) will be made available on the webpage.

Other good textbook resources include:

- Hanley, Shogren, and White: *Introduction to Environmental Economics* (Oxford 2019, 3rd edition)
- Field and Field: *Environmental Economics: An Introduction* (McGraw 2016, 7th edition)
- Hartwick and Olewiler: *The Economics of Natural Resource Use*, 2nd Edition (Addison-Wesley, 1998)
- A book that covers much of the material in the course at an elementary level is Goodstein: *Economics and the Environment* (any edition).

Assignments. There are four homework assignments. Each assignment asks you to use the tools developed in the course to help resolve a timely environmental problem. Figuring out **how to approach the question** is an important part of the course. You can work in a group of **up to three** people for each assignment. You must have a different group for each assignment. Your group should submit a single assignment with all group members' names on it, and you should not share work across groups.

Essay. Detailed essay guidelines can be found on Canvas. This proposal should explain the environmental problem you are interested in writing about and discuss possible concepts and tools from class that may help solve it. Proposals will be peer-reviewed.

Honor Code, Joint Work, and chatGPT. Collaboration with your homework/project partners is encouraged. But it is also important to find a path to a solution on your own, so please do not share answers across groups. It goes without saying that the exams are your own individual work and you are on your honor to execute your exam individually and neither give nor receive aid. Plagiarism will be treated very seriously and will involve reporting to the UCSB graduate division. chatGPT and other generative AI tools are an exciting new resource that may, at times, help you understand concepts from lectures or prepare for exams. However, these tools are **not** allowed to be used for homework, nor on exams, and may not be used to write your essay (we will use AI content detectors when grading final essays). We also caution that these tools often struggle to accurately interpret and respond to the types of economics questions we ask in this course, many of which rely on drawing and interpreting graphs, translating text to conceptually-grounded equations, etc. We recommend that you use them lightly and rely instead on course materials and recommended textbooks.

Prerequisites. You are assumed to be well-versed in calculus, statistics, and ideally, to have had some exposure to basic microeconomics. You are also expected to be conversant with Excel and R or suitable substitutes. The first assignment is designed to help you learn how to use R to solve the kinds of problems we will tackle in this class.

Getting extra help: Come to office hours! This is a challenging course. Please communicate with us if you're having a hard time keeping up and we will help get you the support you need to succeed.

Course Outline: The first several lectures introduce the tools we need for policy evaluation and to help evaluate environmental "solutions". These are applicable across a wide range of environmental issues. We then invoke those tools to address specific classes of environmental problems and related topics.

Schedule (subject to modifications – check Canvas for updated schedule):

1. (1/6): Introduction to the course and environmental economics
2. (1/6): HW #1 distributed. Supply, demand, equilibrium, and R.
3. (1/8): Supply and demand, continued.
4. (1/13): Measuring costs and benefits
5. (1/15): HW #1 due. What happens when the market fails? Externalities.
6. (1/22): HW #2 distributed. How can we fix market failures? Correcting externalities.

7. (1/27): Public goods
8. (1/29): HW #2 due. Can a market solve a market failure? Environmental markets
9. (2/3): Finish lectures and review for midterm
10. (2/5): Midterm in class.
11. (2/10): HW #3 distributed. Who benefits and who is harmed by environmental interventions? Environmental inequality.
12. (2/12): HW #3 due. The role of time in environmental problems and solutions, essay proposal due
13. (2/19): Making decisions under uncertainty
14. (2/24): HW #4 distributed. What is nature worth? Non-market valuation, essay peer review due
15. (2/26): An economist's tool for measuring nature's value: revealed preference
16. (3/3): HW #4 due. Economic growth and sustainability
17. (3/5): International trade and the environment
18. (3/10): Review for Final.
19. (3/12): Final Exam in Class
20. (3/19): Essay due by 10:00 pm

Course conduct: All students are expected to read and comply with the UCSB Code of Conduct. We are committed to making this course a welcoming and inclusive environment for everyone, regardless of gender, gender identity and expression, race, age, sexual orientation, disability, physical appearance, or religion (or lack thereof). We expect all students to help ensure this environment of inclusivity and will not tolerate harassment of any form.

Access and Accommodations: Please submit requests for DSP accommodations early. If you have any kind of disability, whether apparent or non-apparent, learning, emotional, physical, or cognitive you may be eligible to use formal accessibility services on campus. To arrange class-related accommodations, please contact DSP. DSP will initiate communication about accommodations with faculty. By making a plan through DSP, appropriate accommodations can be implemented without disclosing your specific condition or diagnosis to course instructors.

The text below is provided by the UCSB Disabled Students Program.

Counseling and Psychological Services (CAPS): As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce your ability to participate in daily activities. CAPS is available to assist you with

addressing these and other concerns you may be experiencing. You can learn more about the broad range of confidential mental health services available on campus. They can be reached by phone at 805.893.4411, or online at http://caps.sa.ucsb.edu. The CAPS building is the pink building next to the Humanities and Social Science building (HSSB)

Food insecurity: http://food.ucsb.edu/ includes the Cal Fresh Program http://food.ucsb.edu/calfresh and the Associated Students food bank https://foodbank.as.ucsb.edu

Resource Center for Sexual and Gender Diversity (RCSGD) in the SRB, offers a host of services for LGBTQI+ students including a library and many events throughout the year. http://rcsgd.sa.ucsb.edu/

Dream Scholars/Undocumented Student Services Program offers workshops, helps students find scholarships and financial support as well as providing community for our undocumented students. http://www.sa.ucsb.edu/dreamscholars/home

Campus Learning Assistance Services (CLAS) helps students grow academically by offering workshops, walk-in and pre-scheduled tutoring, and writing help both for native and non-native (ESL) English as a second language speakers. Over 50% of students will stop by CLAS at one time or another. http://clas.sa.ucsb.edu

Student Resource Building (SRB) houses many campus resources offices, including the African Diasporic Cultural resource Center, the American Indian Resource Center, the Asian Resource Center, the Middle Eastern Resource Center, the Non-Traditional and Re-Entry Student Resource Center. http://www.sa.ucsb.edu/student-resource-building/home

Multicultural Center (MCC), located in UCEN, hosts a wide variety of cultural events and educational programming throughout the year, including film showings, lectures, musical performances, and more: http://mcc.sa.ucsb.edu/

Campus Advocacy, Resources, & Education (CARE) offers 24/7 confidential support and advocacy in situations of sexual assault, dating and domestic violence, and stalking. Located in the SRB, they can be reached at 805.893.4613 or http://wgse.sa.ucsb.edu/care/home

Financial Crisis Response Team: If you are experiencing issues of housing insecurity contact the Financial Crisis Response Team at financialcrisis@sa.ucsb.edu to begin application for assistance.

Health and Wellness: Student well-being is integral to academic success, student development, and life satisfaction. On this website, students will find links to a range of services related to

well-being such as: assistance with basic needs (food, housing, finances); counseling and physical health resources, daily wellness centers and programs; social connection, and personal safety. https://wellbeing.ucsb.edu/