

AEDE 4310: Environmental and Resource Economics

Autumn 2023

Monday/Wednesday 9:35am – 10:55am

Room 164, Howlett Hall

Instructor: Khyati Malik

Office: 227 Agricultural Administration Bldg.

Email: malik.203@osu.edu

Office Hours: Wednesday 11 am – noon or by appointment. To allow maximum flexibility, I will be available for virtual office hours by appointment. Please email me to schedule.

TA: Yining Wu

Office: 342 Agricultural Administration Bldg.

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Office Hours: Monday 11 am – noon or by appointment. Please email me to schedule.

Course Website: <https://osu.instructure.com/courses/159870>

Course Description:

This foundational environmental and natural resource economics course offers an economic perspective to assess contemporary challenges in environmental protection and natural resource management. In the first part of the course, we will explore fundamental economic principles to address topics such as air and water pollution, environmental valuation methods, and the use of regulation and market-based mechanisms to control pollution. In the second part, we will delve into the economic aspects of both renewable and non-renewable resources, as well as examine the strategies and policies designed to manage natural resources like fisheries and forests. Furthermore, we will explore the principles of dynamic efficiency, discounting, the role of property rights, and the critical aspects of sustainability.

Course Objectives:

Students will gain insight into how economics can be utilized to shape policy responses to address environmental and resource-related challenges.

On completion of the course, successful students will:

1. Demonstrate an understanding of the role of economics in environmental and resource management
2. Be able to elucidate and employ fundamental concepts in the field of environmental economics.
3. Engage in critical discussions and debates regarding existing and prospective environmental policies.
4. Utilize fundamental economic analytical tools to address real-world environmental and natural resource issues.

Prerequisites:

Students are expected to have completed at least one course in microeconomic theory. While we will engage in a concise review of economic principles as required, I will primarily assume that you have a basic understanding of concepts such as supply and demand, utility, and production functions.

Textbook and Readings:

There is no mandatory textbook for this course. Assignments and exams will not feature problems, questions, or case studies directly taken from the textbook. These two optional books are suggested to complement material covered in class and will provide additional context and explanation for the concepts we will explore in this course.

1. Tom Tietenberg and Lynne Lewis, Environmental & Natural Resource Economics (10th Edition, Older editions may be used), Pearson, Addison-Wesley, 2015.
2. Keohane and Olmstead, Markets and the Environment, Washington, D.C.: Island Press, 2007
(Recommended for purchase)

Additional Readings:

Any additional readings will be posted on the Canvas Website.

Class Policies

Course format: This course is structured for 3 credit hours and is scheduled to be conducted in a physical classroom setting unless unforeseen circumstances necessitate a change. Assignments, readings, class notes, and other material will be posted on the Canvas website, but they are not intended as substitutes for lectures. Students are responsible for all the material covered in class, whether it appears on the website or not. If you missed a class, please reach out to me (the instructor) as soon as you can about the topics covered in the lecture you missed. The classroom is a place for mutual respect. I will be prepared with the material for each class and will try to post lecture slides ahead of time. I will expect you to be fully engaged in class.

Exceptions: My priority is to support students with a learning environment that is as safe as possible.

- If you need special accommodation for the entire semester or any part of the semester, please contact Student Life and Disability Services (SLDS) to determine the type of accommodation you need and talk with me as soon as possible. I will work with you to make sure you have access to class lectures and materials. **Please contact me in the first week of the semester to discuss any needs.**
- Your health and safety are most important. If you are sick or need to quarantine, please let me know and I will work with you to make sure you have access to class lectures and materials. If I need to quarantine due to illness or exposure, I will inform you via Carmen/email and will either cancel class or move it to a synchronous virtual class via zoom.
- If there are any weather-related contingencies that make it challenging to commute to campus, I will inform you via Carmen/email and will either cancel class or move it to a synchronous virtual class via zoom.

Please continue to follow University guidelines and regularly monitor your email and the carmen course page for announcement if there are any changes in the guidelines.

Attendance and participation requirements: I will sometimes take formal attendance and expect that you complete weekly online exercises for a participation grade.

- Participating in online exercises for attendance: You are expected to log in to the course in Carmen every week. (During most weeks you will likely log in many times.) If you have a situation that might cause you to miss an entire week of class, discuss it with me as soon as possible.

Course-related Communication

Carmen Course Website: I will be using the website to post material related to lectures, homework assignments and solutions, and as a repository for some notes/handouts and readings. Major announcements will also appear on the website.

Evaluation

Students will be evaluated based on homework assignments, in-class exams, a final examination, and periodic online exercises that will be on Canvas. The breakdown of the total grade is as follows:

- Homework assignments: 30%
- Examinations (2): 40%
- Final examination: 20%
- Participatory online exercises (Quizzes) 10%

Assignments

There will be six homework assignments that will be **due at the beginning of class on the date assigned** on the syllabus. Each assignment counts for 5% of your grade and the **lowest one grade will be dropped**. Students can work in groups and consult with each other when working on the problem sets but you are expected to turn in individual work. You cannot simply copy someone else's work. Late work will be marked down 10% for every day (or part of a day) that they are late.

Examinations

There will be three exams: two in-class exams and a final exam. All exams will be in-class, closed book exams. To allow flexibility with changing circumstances, exams may be administered online.

Quizzes & Class Participation:

In a large class, it is often difficult to gauge the level of understanding of concepts we cover each day. Participation in class discussions and asking questions in class will help clarify and reinforce concepts. Additionally, I will post short review quizzes on Canvas that are intended to help you review concepts covered in class and provide me some feedback.

Grading

We (the teaching assistant and I) will try to ensure that grading is accurate and timely. If you have a question about the way an assignment or exam question was graded, then contact us to discuss the issue.

Grading Scale:

A	93.0-100	C	73.3-76.6
A-	90.0-92.9	C-	70.0-73.2
B+	86.7-89.9	D+	66.7-69.9
B	83.3-86.6	D	60.0-66.6
B-	80.0-83.2	F	<60.0
C+	76.7-79.9		

Excuses and Extensions

Under ordinary circumstances late submissions will be penalized by 5% of the grade for every additional late day. Please contact me in case of extraordinary situations such as

- Serious illness,
- Family emergencies,
- Scheduling conflicts with examinations
- Or other extenuating circumstances.

Academic Integrity Policy

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University's *Code of Student Conduct*, and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University's *Code of Student Conduct* and this syllabus may constitute "Academic Misconduct."

The Ohio State University's *Code of Student Conduct* (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the University or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination.

Ignorance of the University's *Code of Student Conduct* is never considered an "excuse" for academic misconduct, so I recommend that you review the *Code of Student Conduct* and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by University Rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the University's *Code of Student Conduct* (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University. For more information about this policy please visit the Committee on Academic Misconduct web pages ([COAM Home](#)).

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Disability Accommodations

The university strives to maintain a healthy and accessible environment to support student learning in and out of the classroom. If you anticipate

or experience academic barriers based on your disability (including mental health, chronic, or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion.

If you are isolating while waiting for a COVID-19 test result, please let me know immediately. Those testing positive for COVID-19 should refer to the Safe and Healthy Buckeyes site for resources. Beyond five days of the required COVID-19 isolation period, I may rely on Student Life Disability Services to establish further reasonable accommodations. You can connect with them at slds@osu.edu; 614-292-3307; or slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

Counseling and Consultation Services/Mental Health

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 a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life Counseling and Consultation Services (CCS) by visiting ccs.osu.edu or calling (614) 292- 5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on-call counselor when CCS is closed at (614) 292-5766 and 24-hour emergency help is also available through the 24/7 by dialing 988 to reach the Suicide and Crisis Lifeline.

For students in the College of Food, Agricultural, and Environmental Sciences, David Wirt, wirt.9@osu.edu, is the CFAES embedded mental health counselor. He is available for new consultations and to establish routine care. To schedule with David, please call 614-292-5766. Students should mention their affiliation with CFAES if interested in speaking directly with David.

Creating an environment free from harassment, discrimination, and sexual misconduct

The Ohio State University is committed to building and maintaining a community to reflect diversity and to improve opportunities for all. All Buckeyes have the right to be free from harassment, discrimination, and sexual misconduct. Ohio State does not discriminate on the basis of age, ancestry, color, disability, ethnicity, gender, gender identity or expression, genetic information, HIV/AIDS status, military status, national origin, pregnancy (childbirth, false pregnancy, termination of pregnancy, or recovery therefrom), race, religion, sex, sexual orientation, or protected veteran status, or any other bases under the law, in its activities, academic programs, admission, and employment. Members of the university community also have the right to be free from all forms of sexual misconduct: sexual harassment, sexual assault, relationship violence, stalking, and sexual exploitation.

To report harassment, discrimination, sexual misconduct, or retaliation and/or seek confidential and non-confidential resources and supportive measures, contact the Office of Institutional Equity:

1. Online reporting form at equity.osu.edu,
2. Call 614-247-5838 or TTY 614-688-8605,
3. Or Email equity@osu.edu

The university is committed to stopping sexual misconduct, preventing its recurrence, eliminating any hostile environment, and remedying its discriminatory effects. All university employees have reporting responsibilities to the Office of Institutional Equity to ensure the university can take appropriate action:

- All university employees, except those exempted by legal privilege of confidentiality or expressly identified as a confidential reporter, have an obligation to report incidents of sexual assault immediately.
- The following employees have an obligation to report all other forms of sexual misconduct as soon as practicable but at most within five workdays of becoming aware of such information: 1. Any human resource professional (HRP); 2. Anyone who supervises faculty, staff, students, or volunteers; 3. Chair/director; and 4. Faculty member.

Diversity statement:

The Ohio State University affirms the importance and value of diversity of people and ideas. We believe in creating equitable research opportunities for all students and to providing programs and curricula that allow our students to understand critical societal challenges from diverse perspectives and aspire to use research to promote sustainable solutions for all. We are committed to maintaining an inclusive community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among all members; and encourages each individual to strive to reach their own potential. The Ohio State University does not discriminate on the basis of age, ancestry, color, disability, gender identity or expression, genetic information, HIV/AIDS status, military status, national origin, race, religion, sex, gender, sexual orientation, pregnancy, protected veteran status, or any other bases under the law, in its activities, academic programs, admission, and employment.

To learn more about diversity, equity, and inclusion and for opportunities to get involved, please visit:

- odi.osu.edu
- odi.osu.edu/racial-justice-resources
- odi.osu.edu/focus-on-racial-justice
- cbse.osu.edu

In addition, this course adheres to **The Principles of Community** adopted by the College of Food, Agricultural, and Environmental Sciences. These principles can be found at cfaesdei.osu.edu/about-us/cfaes-principles-community. For additional information on Diversity, Equity, and Inclusion in CFAES, contact the CFAES Office for Diversity, Equity, and Inclusion (cfaesdei.osu.edu). If you have been a victim of or a witness to harassment or discrimination or a bias incident, you can report it online and anonymously (if you choose) at equity.osu.edu.

Religious accommodations:

It is Ohio State's policy to reasonably accommodate the sincerely held religious beliefs and practices of all students. The policy permits a student to be absent for up to three days each academic semester for reasons of faith or religious or spiritual belief.

Students planning to use religious beliefs or practices accommodations for course requirements must inform the instructor in writing no later than 14 days after the course begins. The instructor is then responsible for scheduling an alternative time and date for the course requirement, which may be before or after the original time and date of the course requirement. These alternative accommodations will remain confidential. It is the student's responsibility to ensure that all course assignments are completed.

Weather or other short-term closing

Should in-person classes be canceled, I will notify you as to which alternative methods of teaching will be offered to ensure continuity of instruction for this class. Communication will be via [Carmen Canvas, email or other mode of communication].

Copyright Disclaimer

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

Tentative Course Outline

Week	Date	Topic	Readings
Week #1	Jan-8	• Introduction, Logistics and Overview	T&L Chapter 1, 2 / KO Ch. 2,4
	Jan-10	• Markets, Efficiency, and the Environment	
Week #2	Jan-15	Martin Luther King Jr. Day - no class	T&L Chapter 2/ KO Ch 5 <i>Homework 1 Assigned</i>
	Jan-16	Market Failures • Externalities • Public Goods	
Week #3	Jan-22	Market Failures (continued.)	T&L Chapter 2/ KO Ch. 2, Ch 5 KO Ch 8 <i>Homework 1 Due</i> <i>Homework 2 Assigned</i>
	Jan-24	• Public Goods • Property Rights and the Coase Theorem	
Week #4	Jan-29	Environmental Valuation	T&L Chapter 4 / KO Ch. 3 <i>Homework 2 Due</i>
	Jan-31	• Revealed Preference • Stated Preference	
Week #5	Feb-5	Review for Exam 1	
	Feb-7	EXAM 1	
Week #6	Feb-12	• Economics of Pollution Control	T&L Chapter 14 / KO Ch 2,8 <i>Homework 3 Assigned</i>
	Feb-14	• Instruments for Environmental Policy	
Week #7	Feb-19	• Instruments for Environmental Policy	T&L Chapter 14, 15/ KO Ch 9, T&L Chapter 3/ KO Ch 3
	Feb-21	• Benefit Cost Analysis	
Week #8	Feb-26	Introduction to Dynamics and Natural Resources	T&L Chapter 5 / KO Ch. 6 <i>Homework 3 Due</i>
	Feb-28	Managing Natural Resources	T&L Chapter 5 & 6 / KO Ch. 6 <i>Homework 4 Assigned</i>
Week #9	March-4	Economics of Non-Renewable Resources	T&L Chapter 5 & 6 / KO Ch. 6
	March-6	• Land Use and Land Cover Change • Tragedy of the Commons	T&L Chapter 10 / KO Ch. 5 <i>Homework 4 Due</i>
Week #10	March-11	Spring Break	
	March-13		
Week #11	March-18	Review for Exam 2	
	March-20	EXAM 2	
Week #12	March-25	Economics of Renewable Resources	T&L Chapter 12/ KO Ch. 7 <i>Homework 5 Assigned</i>
	March-27	• Fisheries	
Week #13	April-01	Economics of Renewable Resources	T&L Chapter 11, 13 / KO Ch. 7 <i>Homework 5 Due</i>
	April-03	• Forests	
Week #14	April-08	Climate Change and Global Challenges	T&L Chapter 16, 19 / KO Ch. 7 <i>Homework 6 Assigned</i>
	April-10	Equity & Environmental Justice	T&L Chapter 16, 19 / KO Ch. 7
Week #15	April-15	• Economics of Biodiversity	T&L Chapter 13 T&L Chapter 20, 21/ KO Ch. 11 <i>Homework 6 Due</i>
	April-17	• Introduction to Sustainability	
Week #16	April-22	Review for the final exam.	
	April-24	FINAL EXAMINATION PERIOD	

Additional Readings: Here is a list of additional (optional) readings by topics for you to explore further. I will try to make all the readings available on the Carmen Website and indicate which ones are required readings.

I. Introduction to Environmental Economics

Fullerton, D. and R.N. Stavins, “How Economists See the Environment,” in Stavins.

Krutilla, J.V. (1967), “Conservation Reconsidered,” *American Economic Review* 57(4), 777-786.

Goulder, L.H. and R.N. Stavins, “An Eye on the Future,” in Stavins.

II. Benefit Cost Analysis

Arrow, K.J. et al., “Is There a Role for Benefit-Cost Analysis in Environmental, Health, and Safety Regulation,” in Stavins

Kellman, S. “Cost-Benefit Analysis: An Ethical Critique (with replies),” in Stavins.

Palmer, K. et al., “Tightening Environmental Standards: The Benefit-Cost or the No-Cost Paradigm,” in Stavins.

Murdoch, William, Stephen Polasky, Kerrie A. Wilson, Hugh P. Possingham, Peter Kareiva, and Rebecca Shaw. 2007. Maximizing return on investment in conservation. *Biological Conservation* 139 (3-4) (10): 375-88.

III. Pollution Control Policy Instruments

Tietenberg, T.H., “Economic Instruments for Environmental Regulation,” in Stavins.^[L]_{SEP}]

Goulder, L.H., “Environmental Policy Making in a Second Best Setting,” in Stavins.^[L]_{SEP}]

Stavins, R.N., “What Can We Learn from the Grand Policy Experiment? Lessons from SO₂ Allowance Trading,” in Stavins.^[L]_{SEP}]

Sandel, M.J., “It’s Immoral to Buy the Right to Pollute (with replies),” in Stavins.^[L]_{SEP}]

Coase, R.H., 1960. “The Problem of Social Cost,” in Stavins.

Baumol and Oates. Ch. 5, —Uncertainty and the choice of policy instruments: price or quantity controls? pp. 57–78 and Ch.12, Marketable emission permits for protection of the environment, pp.177–189.

M.L. Weitzman, —Prices vs. Quantities, *Review of Economic Studies*, 41 (4) October 1974.

IV. Non-market Valuation: Revealed Preference Methods

Sagoff, Mark, ‘Can we put a price on Nature’s Services?’ in *Taking Sides: Clashing Views on Controversial Environmental Issues*

Daily, Gretchen C., Tore Söderqvist, Sara Aniyar, Kenneth Arrow, Partha Dasgupta, Paul R. Ehrlich, Carl Folke, *et al.* 2000. The value of nature and the nature of value. *Science* 289 (5478): 395-396.

V. Open Access and Common Pool Resources

Hardin, G., "The Tragedy of the Commons," in Stavins.

[1] Excerpts from Bromley, D.W. (1992), "The Commons, Property, and Common-Property Regimes," in D.W. Bromley, Making the Commons Work: theory, practice, and policy, San Francisco.

VI. Economics of Renewable Resources

Wilen, J.E. (2006) "Why fisheries management fails: treating symptoms rather than the cause" Bulletin of Marine Science 78:529-46

Creedy, John, and Anke D. Wurzbacher. 2001. The economic value of a forested catchment with timber, water and carbon sequestration benefits. Ecological Economics 38 (1) (7): 71-83.

Smith, M.D., 2012. The new fisheries economics: incentives across many margins. Annu. Rev. Resour. Econ., 4(1), pp.379-402.

VII. Economics of Non-Renewable Resources

Solow, R.M. (1974), "The Economics of Resources or the Resources of Economics," Journal of Natural Resources Policy Research, Vol 1 (1) 2008.

Wick, Katherina and Erwin Bulte, 2009, The Curse of Natural Resources, Annual Review of Resource Economics 1 (October 2009)

VIII. Sustainable Development

Solow, R.M., "Sustainability: An Economist's Perspective," in Stavins.

Arrow, K. et al. (1995), "Economic growth, carrying capacity, and the environment," Science. 268, 520-521.

Solow, R.M. (1974), "Intergenerational Equity and Exhaustible Resources," Review of Economic Studies.

Hartwick, J.M. (1977), "Intergenerational Equity and the Investing of Rents from Exhaustible Resources," AER.