

MES 623: Applied Economics for Environmental Management

Renato Molina

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Office Hours: M 2:00 - 4:00

Office: 213 CIMAS - RSMAS

Teaching Assistant: Matthew Varkony

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Class Hours: MW 12:00-1:15

Class Room: SLAB 120

Section Hours: W 1:30-2:30

UM Bulletin Description

The objective of this course is to familiarize students with economic arguments and methods applied to environmental problems, such as environmental quality, natural resource management, and conservation. The course will cover economics and computer programming, but the emphasis will be set on developing communication skills to inform policy making. The class is intended for graduate students seeking to develop intuition and the skills necessary for the discussion of environmental policies.

Course Description

In this class, students will be introduced to environmental economics from an applied perspective. Throughout the class, they will learn how economics can be used to analyze and solve real environmental problems. More importantly, they will learn how to communicate results in a way that informs policy making.

Environmental problems are often caused because of the utilization of scarce environmental resources by human systems. Economics, as the science studying how to allocate scarce resources, becomes a powerful tool to analyze these issues as well as to provide solutions. This class will train students on how to frame these problems using economic arguments and to devise policy mechanisms to solve them. Four types of standard problems will be examined: Climate change, overexploitation, pollution, and environmental conservation. The class is intended for graduate students seeking to understand how to use economics for environmental management and policy.

Prerequisites: Students should have taken MES 624 or have the permission of the instructor.

Course Objectives

1. Students will learn the fundamental concepts associated with economic analysis of environmental problems.

2. Students will become familiar with different market solutions to environmental problems.
3. Students will learn computer programming applied to economic analysis of environmental problems.
4. Students will practice deriving and communicating policy recommendations.

Readings

Unless students are planning to specialize in the topic, renting textbooks is recommended.

Required

Berck, Peter and Gloria E Helfand (2011). *The economics of the environment*. Pearson Addison-Wesley.

Charles, Kolstad and others (2000). *Environmental Economics*. 2nd. Oxford University Press, Oxford, UK.

Optional

Boardman, Anthony E, David H Greenberg, Aidan R Vining, and David L Weimer (2017). *Cost-benefit analysis: concepts and practice*. Cambridge University Press.

Wickham, Hadley and Garrett Grolemund (2016). *R for data science: import, tidy, transform, visualize, and model data*. " O'Reilly Media, Inc."

Course Policies

Grading Policy

- Group assignments (20%)
- Two midterms (25% each)
- A final examination (30%)

Four group assignments will be posted throughout the semester. All of the homework assignments are in the form of mini-projects dealing with one specific environmental problem. Students must complete all of them. The deliverable is a one-page memo (typed, single spaced, 12 point) to a policy-maker and an appendix with details. The students are expected to produce high quality, polished, professional work. Late work will not be graded, unless an exception has been granted prior to the due date.

Assignments are key to mastering the material and preparing for examinations. During sections, the teaching assistant will work with students to solve the assignments using the concepts covered in class. Students will then focus on effectively communicating conclusions from their analyses.

Attendance Policy

Students are expected to abide by the University of Miami's attendance [policy](#). Other absence reasons should be discussed with me in advance.

E-mail Policy

I am usually quick to respond to e-mails. Sometimes, however, I may get busy and fail to write back in time. If you do not receive a response after one or two days, please feel free to reach out again.

Honor Policy

All students are expected to abide by the University of Miami's honor [code](#). Anyone caught cheating on exams, improperly referencing published written or electronic material, or submitting work that is not their own will fail the course.

Technology During Lectures Policy

The use of technology for any other purpose that is not taking notes or working on the class content is highly discouraged. Repeated violations to this policy will result in final grade penalizations.

Lecture Schedule

Students must read the assigned chapters or papers before lecture. Important: Readings are subject to change, contingent on mitigating circumstances and the progress of the class. Any changes will be announced via Blackboard.

Week 01, 01/13 - 01/17: Introduction and Markets

Berck & Helfand Ch.1,2 • Kolstad Ch.1,4

Fullerton, Don and Robert Stavins (1998). "How economists see the environment". In: *Nature* 395.6701, p. 433.

Week 02, 01/20 - 01/24: Consumer Theory

Berck & Helfand Ch.4-5,9 • Kolstad Ch.3,15

Week 03, 01/27 - 01/31: Producer Theory and Welfare

Berck & Helfand Ch.3,10 • Kolstad Ch.5,9

Week 04, 02/03 - 02/07: Market Failure and Market Solutions

Berck & Helfand Ch.11

- **Assignment I (Friday)**

Week 05, 02/10 - 02/14: Environmental Policy

Berck & Helfand Ch.12 • Kolstad Ch.12

- **Midterm I (Wednesday)**

Week 06, 02/17 - 02/21: Efficiency, Utility and Public Decisions

Ando, Amy, Jeffrey Camm, Stephen Polasky, and Andrew Solow (1998). "Species distributions, land values, and efficient conservation". In: *Science* 279.5359, pp. 2126–2128.

Kotchen, Matthew J and Nicholas E Burger (2007). "Should we drill in the Arctic National Wildlife Refuge? An economic perspective". In: *Energy Policy* 35.9, pp. 4720–4729.

Polasky, Stephen, Erik Nelson, Jeff Camm, Blair Csuti, Paul Fackler, Eric Lonsdorf, Claire Montgomery, Denis White, Jeff Arthur, Brian Garber-Yonts, and others (2008). "Where to put things? Spatial land management to sustain biodiversity and economic returns". In: *Biological conservation* 141.6, pp. 1505–1524.

Arrow, Kenneth J, Maureen L Cropper, George C Eads, Robert W Hahn, Lester B Lave, Roger G Noll, Paul R Portney, Milton Russell, Richard Schmalensee, V Kerry Smith, and others (1996). "Is

there a role for benefit-cost analysis in environmental, health, and safety regulation?" In: *Science* 272.5259, pp. 221–222.

Costello, Christopher, Steven Gaines, and Leah R Gerber (2012). "Conservation science: A market approach to saving the whales". In: *Nature* 481.7380, p. 139.

Week 07, 02/24 - 02/28: Incidence and Discounting

Grainger, Corbett A and Charles D Kolstad (2010). "Who pays a price on carbon?" In: *Environmental and Resource Economics* 46.3, pp. 359–376.

A Look at Six State Proposals to Tax Carbon (2016). *A Look at Six State Proposals to Tax Carbon*.

Nordhaus, William D (2007). "A Review of the Stern Review on the Economics of Climate Change". In: *Journal of Economic Literature* 45.3, pp. 686–702. ISSN: 0022-0515. DOI: 10.1257/jel.45.3.686. <http://dx.doi.org/10.1257/jel.45.3.686>.

Week 08, 03/02 - 03/06: Risk, Uncertainty, and Measurement

Costello, Christopher J, Michael G Neubert, Stephen A Polasky, and Andrew R Solow (2010). "Bounded uncertainty and climate change economics". In: *Proceedings of the National Academy of Sciences* 107.18, pp. 8108–8110.

Weitzman, Martin L (2011). "Fat-tailed uncertainty in the economics of catastrophic climate change". In: *Review of Environmental Economics and Policy* 5.2, pp. 275–292.

Halpern, Benjamin S, Catherine Longo, Darren Hardy, Karen L McLeod, Jameal F Samhour, Steven K Katona, Kristin Kleisner, Sarah E Lester, Jennifer O'leary, Marla Ranelletti, and others (2012). "An index to assess the health and benefits of the global ocean". In: *Nature* 488.7413, p. 615.

- **Assignment II (Friday)**

Week 09, 03/09 - 03/13: Spring Recess

Week 10, 03/16 - 03/20: Revealed and Stated Preference

White, PCL and JC Lovett (1999). "Public preferences and willingness-to-pay for nature conservation in the North York Moors National Park, UK". In: *Journal of Environmental Management* 55.1, pp. 1–13.

Strager, Michael P and Randall S Rosenberger (2006). "Incorporating stakeholder preferences for land conservation: Weights and measures in spatial MCA". In: *Ecological Economics* 57.4, pp. 627–639.

Carson, Richard T and W Michael Hanemann (2005). "Contingent valuation". In: *Handbook of environmental economics* 2, pp. 821–936.

Week 11, 03/23 - 03/27: Regulatory options

Peltzman, Sam and T. Nicolaus Tideman (1972). "Local versus National Pollution Control: Note". In: *The American Economic Review* 62.5, pp. 959-963.

Weitzman, Martin L (2014). "Can negotiating a uniform carbon price help to internalize the global warming externality?" In: *Journal of the Association of Environmental and Resource Economists* 1.1/2, pp. 29–49.

- **Midterm II (Wednesday)**

Week 12, 03/30 - 04/03: Spatial Environmental Uncertainty Regulation and Policy Design

Rassweiler, Andrew, Christopher Costello, and David A Siegel (2012). "Marine protected areas and the value of spatially optimized fishery management". In: *Proceedings of the National Academy of Sciences* 109.29, pp. 11884–11889.

Smith, Martin D and James E Wilen (2003). "Economic impacts of marine reserves: the importance of spatial behavior". In: *Journal of Environmental Economics and Management* 46.2, pp. 183–206.

Faucheux, Sylvie and Géraldine Froger (1995). "Decision-making under environmental uncertainty". In: *Ecological economics* 15.1, pp. 29–42.

- **Assignment III (Friday)**

Week 13, 04/06 - 04/10: Disasters

Anttila-Hughes, Jesse and Solomon Hsiang (2013). "Destruction, disinvestment, and death: Economic and human losses following environmental disaster". In: *SSRN*.

Parker, Dominic P and Bryan Vadheim (2017). "Resource Cursed or Policy Cursed? US Regulation of Conflict Minerals and Violence in the Congo". In: *Journal of the Association of Environmental and Resource Economists* 4.1, pp. 1–49.

Taylor, M Scott (2009). "Environmental Crises: Past, Present ad Future". In: *Forthcoming in the Canadian Journal of Economics, November 2009 as the Innis Lecture*.

Week 14, 04/13 - 04/17: Endangered Species

Kremer, Michael and Charles Morcom (2000). "Elephants". In: *American Economic Review* 90.1, pp. 212–234.

Shogren, Jason F, John Tschirhart, Terry Anderson, Amy Whritenour Ando, Steven R Beissinger, David Brookshire, Gardner M Brown Jr, Don Coursey, Robert Innes, Stephen M Meyer, and others (1999). "Why economics matters for endangered species protection". In: *Conservation biology* 13.6, pp. 1257–1261.

Week 15, 04/20 - 04/24: Active Discussion

Week 16, 04/27 - 05/01: Finals Week

Week 17, 05/04 - 05/08: Finals Week

- **Assignment IV**
- **Final**

Section Schedule

Week 01, 01/13 - 01/17: R-Studio

Week 02, 01/20 - 01/24: Functions and loops

Week 03, 01/27 - 01/31: Simulation

Week 04, 02/03 - 02/07: Optimization

Week 05, 02/10 - 02/14: Environmental Conservation

Week 06, 02/17 - 02/21: Cost-Effectiveness and Cost-Benefit

Week 07, 02/24 - 02/28: Conservation Strategies

Week 08, 03/02 - 03/06: Uncertainty and Discounting

Week 09, 03/09 - 03/13: Spring recess

Week 10, 03/16 - 03/20: Stated Preference

Week 11, 03/23 - 03/27: Willingness to Pay for the Environment

Week 12, 03/30 - 04/03: Production and Pollution Externality

Week 13, 04/06 - 04/10: Regulation Mechanisms

Week 14, 04/13 - 04/17: Prices v/s Quantities

Week 15, 04/20 - 04/24: Review