

Environment 235: Economics of Natural Resources and Environment

Winter 2018 Course Syllabus
(Version: March 30th, 2018)

Logistics

Lecture: TR 10:00-11:30 a.m. (Angell Hall G115)

Professor: Samuel Stolper (sstolper@umich.edu)

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Website: <https://umich.instructure.com/courses/211774>

Office Hours: T 3:00pm-5:00pm (Sam; Dana 3006); M 4:00-5:00pm and T 1:30-2:30pm (Kirstie; Dana 4036)

About this course

What role should government play in managing the Earth's natural resources and ecosystems?

In this course, we will use economics as a lens through which to analyze the interaction between humans and the environment. We will learn the economics rationale for government regulation of environmental quality; we will identify the behavioral and institutional challenges to effective regulation; and we will explore the many policy tools at our disposal. You will become adept at applying economic intuition to all types of questions about the environment and, in the process, hone your analytical, writing, and communication skills.

In the first half of the course, we will master the economic theory and concepts that are common to many environmental policy contexts. In the second half, we will then apply what we have learned to today's most important environmental topics. The emphasis will be on climate change, which many people see as the preeminent environmental issue of our time. We will learn how climate change challenges conventional economic analysis, and we will learn how governments have attacked this challenge so far. The causes and effects of climate change reach far and wide, and so in this part of the course, we will also study electricity markets, transportation, water pollution, and conservation, among other relevant topics. We will take as case studies several different countries with unique environmental and economic profiles, and we will additionally see how domestic markets and policies truly have global consequences.

Class format and teaching goals

I have designed this course with several teaching goals in mind:

- Provide a comprehensive introduction to the economics perspective on environmental protection and degradation around the world.
- Train students to utilize economics as a tool for critically analyzing subjects with real social import.
- Help students improve rhetorical skills that extend far beyond the confines of environmental policy: framing difficult questions, seeing all sides of an issue, and writing and speaking as tools for communicating these questions and issues.

I think the best way to achieve these goals is to engage you, the students, as much as possible, and in as many ways as possible. I will devote some part of most class meetings to lecture, but I will also emphasize discussion, both during lecturing and in dedicated periods of class time. Furthermore, I will introduce several participatory, interactive activities designed to vary your modes of learning. Perhaps most importantly, I will strive to make you feel comfortable speaking up, raising questions in all class meetings.

Assignments

Readings

For most classes, you will be assigned readings from some combination of textbooks, academic journals, blogs, and popular media.

The textbook for this course is Nathaniel O. Keohane and Sheila M. Olmstead, Markets and the Environment, 2nd Edition (2016). This textbook is available digitally from the University of Michigan library system at <<https://mirlyn.lib.umich.edu/Record/015159266>>.

Many of the assigned readings come from the blog run by the Energy Institute at Haas, based at the University of California Berkeley, Haas School of Business. There is an excellent group of environmental and energy economists at Berkeley, and you are encouraged to peruse the blog (<https://energyathaas.wordpress.com/>) beyond the assigned readings.

Problem Sets

These will be scattered throughout the semester, approximately once every two weeks, and will test a variety of skills. In some cases, you may be asked to graphically analyze a market that impacts the environment. In another, you may be asked to develop a cost-benefit analysis of a proposed policy. In yet another, you might be prompted to discuss the strengths and weaknesses of the economic tools themselves.

Writing Assignments

Writing is an extremely important professional skill that is often under-emphasized in quantitative coursework. In this course, I will ask you to practice your writing skills in both shorter and longer formats, and I will help you do this. During the latter half of the semester, you will draft and subsequently edit and complete a research-and-argument paper (of medium length) on an environmental policy topic to be determined.

Participation

In-class participation, in discussion and any other learning activities, will be a part of your final grade. This should not intimidate you; the course will be more fun and more valuable if we all share our perspectives, our questions, our ideas.

Grading

The distribution of course grades will resemble that of other courses within the Program in the Environment. The weight of each assignment is as follows:

- Class participation: 10%
- Problem sets: 20% (5 problem sets, dropping the lowest score)
- Op-ed exercise: 5%
- Midterm: 15%
- Policy analysis: 10%
- Program evaluation: 10%
- Final exam: 30%

Late (unexcused) submissions will be penalized 10% of the assignment's point value per day (calendar date). Please notify me as soon as possible of any requests for excused absence.

Other course policies

Laptops and phones: Neither laptops nor phones are allowed in class. They would inevitably draw your attention away from class lecture and discussion.

Correspondence: I will try to get back to your emails within 24 hours. Please note Environ 235 in your subject line. If you plan on asking multiple involved questions, please come to my office hours or schedule a meeting with me.

Homework submission: Problem sets and written assignments are due at the beginning of class, unless otherwise stipulated. You may submit your work via the homework section of the Canvas course website, or in person to Kirstie.

Grade grievances: You must submit requests for a re-grade within one week of receiving the original grade. You must also attach the original graded item and provide a clear written explanation of what you would like to be re-evaluated and why. Your adjusted grade may be higher or lower than the original.

Work ethic: Do not plagiarize. If you paraphrase or copy work that is not your own, you must reference that work. The risk of plagiarizing is not worth the reward. More generally, cheating and academic dishonesty in any form will not be tolerated. Any student found to have cheated or behaved unethically or dishonestly will be given a zero on the assignment or exam involved and referred to the appropriate disciplinary committees at U of M.

Course calendar

Date	Day	#	Unit	Assignment Due
1/4	Th	1	Why Study Environmental Economics?	Response to Fishbanks
1/9	T	2	Fishbanks: A Simulation Game	
1/11	Th	3	The Tragedy of the Commons	
1/16	T	4	Externalities and Public Goods	
1/18	Th	5	Market-Based Policies	PS #1
1/23	T	6	Command-and-Control Policies	
1/25	Th	7	Cost-Benefit Analysis	Op-ed
1/30	T	8	Distributional Equity	
2/1	Th	9	Measuring Costs	PS #2
2/6	T	10	Measuring Benefits	
2/8	Th	11	Measuring Benefits II	Policy Analysis
2/13	T	12	CLASS CANCELED	
2/15	Th	13	Empirical Challenges to Measurement	
2/20	T	14	Midterm Review	
2/22	Th	15	Midterm	
2/27	T		NO CLASS – SPRING BREAK	
3/1	Th		NO CLASS – SPRING BREAK	
3/6	T	16	Estimating the Impacts of Climate Change	PS #3
3/8	Th	17	The Social Cost of Carbon	
3/13	T	18	International Climate Negotiation	
3/15	Th	19	International Climate Negotiation II	PS #4
3/20	T	20	Trade, Deforestation, and Global Markets	
3/22	Th	21	International Development	
3/27	T	22	Electric Power	
3/29	Th	23	Electricity Market Game I	PS #5
4/3	T	24	Electricity Market Game II	
4/5	Th	25	Energy Efficiency	
4/10	T	26	Transportation	Program evaluation 4:00-6:00pm
4/12	Th	27	Wrap-Up: The Future	
4/17	T	28	Final Exam Review	
4/23	M	–	Final Exam	

Detailed course schedule

Class #1 – January 4th. Why You Should Study Environmental Economics

No Readings

Class #2 – January 9th. Fishbanks: A Simulation Game

In-class simulation game: Fishbanks

Readings/Viewings

1. Sterman, John and Andrew King. “Introduction to Fishbanks.”
2. Sterman, John. “Fishbanks: Renewable Resource Management Simulation.”
3. Sterman, John. “Fishbanks Simulation: Student Instructional Video.”
<<https://mitsloan.mit.edu/LearningEdge/simulations/fishbanks/Pages/Video.aspx>>.

Class #3 – January 11th. The Tragedy of the Commons

Readings

1. Sterman, John and Andrew King. “Fishbanks: Debriefing Guide and Teaching Note.” pp. 3-4.

Assignments

1. Response to Fishbanks

Class #4 – January 16th. Externalities and Public Goods

Readings

1. Keohane and Olmstead (hereafter, abbreviated 'KO'): Chapter 2, pp. 11-30; and Chapter 5, pp. 80-94.
2. National Research Council (2010). “Hidden Costs of Energy: Unpriced Consequences of Energy Production and Use.” Introduction, pp. 3-21.

Class #5 – January 18th. Market-Based Policies

Readings

1. KO: Chapter 8, pp. 139-162.
2. Schmalensee, Richard and Robert N. Stavins (2013). “The SO₂ Allowance Trading System: The Ironic History of a Grand Policy Experiment.” *Journal of Economic Perspectives* 27(1): 103-122.

3. Harvey, Fiona. "China Aims to Drastically Cut Greenhouse Gas Emissions Through Trading Scheme." *The Guardian*, December 19th, 2017. <<https://www.theguardian.com/environment/2017/dec/19/china-aims-to-drastically-cut-greenhouse-gas-emissions-through-trading-scheme>>.

Class #6 – January 23rd. Command-and-Control Policies

Readings

1. KO: Chapter 8, pp. 168-198.
2. Fowlie, Meredith, Lawrence Goulder, Matthew Kotchen, Severin Borenstein, James Bushnell, Lucas Davis, Michael Greenstone, Charles Kolstad, Christopher Knittel, Robert Stavins, Michael Wara, Frank Wolak, and Catherine Wolfram (2014). "An Economic Perspective on the EPA's Clean Power Plan." *Science* 346(6211): 815-816.

Assignments

1. Problem Set #1 due by start of class

Class #7 – January 25th. Cost-Benefit Analysis

Readings

1. KO: Chapter 3, pp. 55-68.
2. United States Environmental Protection Agency, "The Benefits and Costs of the Clean Air Act: 1990 to 2020." Second Section 812 Prospective Analysis. Revised SAB Council Review Draft – August 2010. Chapters 1 and 7.
3. Sunstein, Cass. "The Stunning Triumph of Cost-Benefit Analysis." Bloomberg.com, September 12th, 2012.
<<https://www.bloomberg.com/view/articles/2012-09-12/the-stunning-triumph-of-cost-benefit-analysis>>.

Class #8 – January 30th. Distributional Equity

Readings

1. Fullerton, Don (2011). "Six Distributional Effects of Environmental Policy." *Risk Analysis* 3(6): 923-929.
2. Guerin, Emily. "Environmental groups say California's climate program has not helped them." *National Public Radio*, February 24th, 2017.
<<http://www.npr.org/2017/02/24/515379885/environmental-groups-say-californias-climate-program-has-not-helped-them>>.
3. Banzhaf, H. Spencer. "The Political Economy of Environmental Justice." Resources for the Future Policy Commentary, May 25th, 2009.
<<http://www.rff.org/blog/2009/political-economy-environmental-justice>>.

Assignments

1. Op-ed due by start of class

Class #9 – February 1st. Measuring Costs

Readings

1. KO: Chapter 3, pp. 35-55.
2. Stolper, Samuel. “Who Bears the Burden of Energy Taxes?” *Sense and Sustainability*. May 4th, 2015. <<http://www.senseandsustainability.net/2015/05/04/who-bears-the-burden-of-energy-taxes-the-distributional-impacts-of-environmental-policies/>>.

Class #10 – February 6th. Measuring Benefits

Readings

1. Muehlenbachs, Lucija, Beia Spiller, and Christopher Timmins. “The Housing-Market Impacts of Shale-Gas Development.” VoxEU.org, February 9th, 2014. <<http://voxeu.org/article/shale-gas-and-housing-market>>.
2. McGinty, Jo Craven. “The Numbers: Why Government Puts a Dollar Value on Life.” *Wall Street Journal* March 26th, 2016.
3. Krupnick, Alan and Juha Siikamaki (2007). “How People Value What Nature Provides.” *Resources* magazine, pp. 14-16.

Assignments

1. Problem Set #2 due by start of class

Class #11– February 8th. Measuring Benefits II

No readings

Class #12– February 13th. CLASS CANCELED

Class #13– February 15th. Empirical Challenges to Measurement

Readings

1. Abdul Latif Jamil Poverty Action Lab. “Cleaner Water at the Source.” J-Pal Policy Briefcase, September 2012.
2. **Introduction** in Currie, Janet and Reed Walker (2011). “Traffic Congestion and Infant Health: Evidence from E-ZPass.” *American Economic Journal: Applied Economics* 3(1): 65-90.

Class #14 – February 20th. Midterm Review

Assignments

1. Policy analysis due by start of class

Class #15 – February 22nd. MIDTERM

February 27th – NO CLASS – Spring Break

March 1st – NO CLASS – Spring Break

Class #16 – March 6th. Estimating the Impacts of Climate Change

Readings

1. Heal, Geoffrey and Jisung Park (2016). “Temperature Stress and the Direct Impact of Climate Change: A Review of an Emerging Literature.” *Review of Environmental Economics and Policy* 10(2): 347-362.
2. Kristof, Nicholas. “Temperatures Rise, and We’re Cooked.” *New York Times*, September 10th, 2016. <<https://www.nytimes.com/2016/09/11/opinion/sunday/temperatures-rise-and-were-cooked.html>>.

Class #17 – March 8th. The Social Cost of Carbon

Readings

1. Greenstone, Michael, Elizabeth Kopits, and Ann Wolverton (2013). “Developing a Social Cost of Carbon for US Regulatory Analysis: A Methodology and Interpretation.” *Review of Environmental Economics and Policy* 7(1): 23-46.
2. Bordoff, Jason. “Trump vs. Obama on the Social Cost of Carbon — And Why It Matters.” *Wall Street Journal*, November 15th, 2017. <<https://blogs.wsj.com/experts/2017/11/15/trump-vs-obama-on-the-social-cost-of-carbon-and-why-it-matters/>>.

Class #18 – March 13th. International Climate Negotiation

Readings

1. KO: Chapter 5, pp. 94-97.
2. Center for Climate and Energy Solutions (2015). “Outcomes of the U.N. Climate Change Conference in Paris.”

Assignments

1. Problem Set #3 due by start of class

Class #19 – March 15th. International Climate Negotiation II

No Readings

Class #20 – March 20th. Trade, Deforestation, and Global Markets

Readings

1. Fowle, Meredith. “Will Coal Exports Abroad Offset Hard-Won Carbon Reductions at Home?” *Energy Institute at Haas* blog, July 28th, 2014.
<<https://energyathaas.wordpress.com/2014/07/28/will-coal-exports-abroad-offset-hard-won-carbon-reductions-at-home/>>.
2. Union of Concerned Scientists (2011). “Fact Sheet: Drivers of Deforestation.”

Class #21 – March 22nd. International Development and the Environment

Readings

1. Greenstone, Michael and B. Kelsey Jack (2015). **Introduction** (pp. 1-9) in “Envirodeconomics: A Research Agenda for an Emerging Field.” *Journal of Economic Literature* 53(1): 5-42.
2. Davis, Lucas. “Cooling India.” *Energy Institute at Haas* blog, July 24th, 2017.
<<https://energyathaas.wordpress.com/2017/07/24/cooling-india/>>.

Assignments

1. Problem Set #4 due at beginning of class.

Class #22 – March 27th. Electric Power

Readings

1. Fowle, Meredith. “The Decline of Coal: Break the Fall or Soften the Blow?” *Energy Institute at Haas* blog, December 11th, 2017. <<https://energyathaas.wordpress.com/2017/12/11/the-decline-of-coal-break-the-fall-or-soften-the-blow/>>.
2. Laidler, John. “Should Massachusetts commit itself to 100 percent renewable energy?” *The Boston Globe*, March 17th, 2017.
<<https://www.bostonglobe.com/metro/regionals/south/2017/03/17/should-massachusetts-commit-itself-percent-renewable-energy/fp0PmIhFzbRf6A3VMhiuEP/story.html>>.
3. (Optional) Federal Energy Regulatory Commission (2015). Chapter 3 in “Energy Primer: A Handbook of Energy Market Basics.” pp. 35-102.

Class #23 – March 29th. Electricity Market Game

No readings

Class #24 – April 3rd. Electricity Market Game

No readings

Class #25 – April 5th. Energy Efficiency

Readings

1. Cavanagh, Ralph. “How We Learned Not to Guzzle.” *The New York Times*, September 12th, 2013. <<http://www.nytimes.com/2013/09/13/opinion/how-we-learned-not-to-guzzle.html>>.
2. **Pp. 3-13 and 19-21** in Allcott, Hunt and Michael Greenstone (2012). “Is There an Energy Efficiency Gap?” *Journal of Economic Perspectives* 26(1): 3-28.
3. Fowlie, Meredith, Michael Greenstone, and Catherine Wolfram (2015). “Costs of Residential Energy Efficiency are Twice their Benefits: Implications for Policy.” E2e Policy Brief.

Assignments

1. Problem Set #5 due at beginning of class

Class #26 – April 10th. Transportation

Readings

1. **Section I** in Allcott, Hunt and Christopher Knittel (2017). “Are Consumers Poorly-Informed about Fuel Economy? Evidence from Two Experiments.” National Bureau of Economic Research Working Paper 23076.
2. Kahn, Matthew. “Some Uber Environmental Economics.” *Environmental and Urban Economics*, January 15th, 2016.
<<http://greeneconomics.blogspot.com/2016/01/some-uber-environmental-economics.html>>

Class #27 – April 12th. Wrap-up: The Future

Readings

1. Auffhammer, Maximilian. “The Economics of an Electrified Autonomous Future.” *Energy Institute at Haas Blog*, August 21st, 2016. <<https://energyathaas.wordpress.com/2017/08/21/the-economics-of-an-electrified-autonomous-future/>>.
2. Auffhammer, Maximilian. “Giving Up on Carbon Markets in Favor of a Giant Vacuum in the Sky?” *Energy Institute at Haas Blog*, May 23rd, 2016. <<https://energyathaas.wordpress.com/2016/05/23/giving-up-on-carbon-markets-in-favor-of-a-giant-vacuum-in-the-sky/>>.
3. D’Aprile, Paolo, John Newman, and Dickon Pinner. “The New Economics of Energy Storage.” McKinsey, August 2016. <<https://www.mckinsey.com/business-functions/sustainability-and-resource-productivity/our-insights/the-new-economics-of-energy-storage>>.

Class #28 – April 17th. Final exam review.

Assignments

1. Program evaluation due at the start of class

FINAL EXAM – April 23rd, 4:00-6:00pm (Location: Angell G115)