

## AREC 489C: The Economics of Climate Change

### Spring 2009

Tue,Thu 12:30pm – 1:45pm, MTH0304

<http://courses.arec.umd.edu/489c>

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### Course Description

Climate change issues and climate policy have received increasing attention over the last years. This course examines the role of economics in the formation of climate policy. Starting with an introduction into the basics of climate change, we will discuss basic concepts of environmental economics like efficiency, externalities, and environmental policy instruments. In applying those to the climate change problem, we will face questions on intertemporal decisions (should we act now or later), have to deal with uncertainties about impacts of climate change and costs of mitigation and adaptation, and with problems of international cooperation. The general economic principles will be applied in discussing selected applications like impacts of climate change on agriculture, the role of energy use, and in analyzing prominent climate policy approaches at the national and international level. Discussions of current policy initiatives and newspaper reports will complement the course.

### Reference Material

There is no required text. The required reading will draw material from different sources. Parts of the course will use documents prepared by the IPCC (Intergovernmental Panel on Climate Change). Those can be accessed online at <http://www.ipcc.ch/>. Websites which are worthwhile looking at are [www.rff.org](http://www.rff.org) and <http://www.pewclimate.org/>. <http://www.climate-science.gov/Library/sap/default.htm>. Other sources will be announced later in the course and on the webpage. You should also follow the news and look for newspaper articles on the subject.

Research papers which are required or suggested reading will be made accessible on the course webpage (<http://courses.arec.umd.edu/489c>) at the given time during the semester. You should check this webpage for updates of the reading list.

### Course Requirements

Grades will be determined by your performance on exams, a group project dealing with a specific research/policy question, homework problem sets, as well as attendance, quizzes, and class participation. There will be two exams: a midterm and a final.

The final grade will be weighted as follows:

<b>Class participation and in-class quizzes</b>	<b>10%</b>	<b>Policy project – memo/presentation</b>	<b>20%</b>
<b>Problem sets (5)</b>	<b>15%</b>	<b>Final exam (19 May)</b>	<b>30%</b>
<b>Midterm exam (10 March)</b>	<b>25%</b>		

**Class participation/Quizzes (10%).** Participation and discussion of issues is encouraged and will be counted in the evaluation. There will be little quizzes in some of the classes. You are encouraged to read the suggested materials and to come to class with questions and comments.

**Problem sets (15%).** Five problem sets will be assigned during the course. Problem sets are due in my box (2200 Symons Hall) by 4:30 pm on the due date. Problem sets will be based upon material currently covered in the course. For the grade, the highest 3 out of 5 problem sets will count. All assignments will be accepted in class on the due date and in my box in 2200 Symons Hall before 4:30 pm.

**Midterm exam (25%).** A midterm exam will be given in class on **March 10**. The exam will last 1 hour and 15 minutes and will cover material up to that point in the course.

**Group research/policy project – Memo and presentation (20%).** (second half of the semester). You will prepare a memo on a specific policy issue or research question and make an presentation in class. You will work as part of a small group and your grade will be based on assessment both from the instructor and your peers. Maximum length of memo: 10 pages, with up-front summary. The memo must be distributed to the class at least 2 days before the presentation. Maximum length of presentation: 10-12 slides (not including title slide). Use Microsoft Powerpoint or similar programs for presentation. Do not over-pack or use gratuitous formatting in presentation. See “Tips on Writing a Policy Memo”, available at: <http://wilcoxon.cp.maxwell.syr.edu/pages/275.html>.

**Final Exam (30%).** A final exam is scheduled for **May 19**. The exam will last 2 hours and will cover all of the course material.

**University’s Code of Academic Integrity.** I expect every student in this course to conform to the University’s Code of Academic Integrity, available on the Web at <http://www.shc.umd.edu/code.html>. While you are welcome to work together on homework assignments, all work turned in should be written by each student individually and expressed in each student’s own words.

## Course Outline

### **Background reading:**

Congressional Budget Office (2003), “The Economics of Climate Change: A Primer”  
Available at <http://www.cbo.gov/ftpdocs/41xx/doc4171/04-25-ClimateChange.pdf>

Goulder, Lawrence and William Pizer. 2005. The Economics of Climate Change. The New Palgrave Dictionary of Economics, Second Edition.

CCSP, 2008. “Analyses of the effects of global change on human health and welfare and human systems. A Report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research”. [Gamble, J.L. (ed.), K.L. Ebi, F.G. Sussman, T.J. Wilbanks, (Authors)]. U.S. Environmental Protection Agency, Washington, DC, USA.

Available at <http://www.climatescience.gov/Library/sap/sap4-6/final-report/>

Toman, Michael. 2003. Economic Analysis and the Formulation of U.S. Climate Policy. RFF Discussion Paper 02-59.

## Part 1: Introduction

IPCC (2007), “Climate Change 2007: Synthesis Report. Summary for Policymakers”  
Available at <http://www.ipcc.ch/ipccreports/ar4-syr.htm>

PEW Center (2007), "Climate Change 101: The Science and Impacts", Pew Center on Global Climate Change. Available at [http://www.pewclimate.org/docUploads/101\\_Science\\_Impacts.pdf](http://www.pewclimate.org/docUploads/101_Science_Impacts.pdf)

National Assessment Synthesis Team, US Global Change Research Program (2000), "Climate Change Impacts on the United States The Potential Consequences of Climate Variability and Change" Available at <http://www.usgcrp.gov/usgcrp/Library/nationalassessment/overview.htm>

## **Part 2: The Economics of Climate Change - Methods**

Kolstad, Charles, (2000), "Environmental Economics", Oxford University Press, New York

Kolstad, Charles and Michael Toman (2001), "The Economics of Climate Policy", Discussion Paper 00-40REV, Resources for the Future, Washington DC. Available at <http://www.rff.org/rff/Documents/RFF-DP-00-40.pdf>

(Additional reading will be announced later during the course and is available at the website.)

### **A. Efficiency, public goods and externalities**

Fullerton, D. and Robert N. Stavins. 1998. How Economists see the Environment. *Nature* 395:433-434.

Tietenberg, Tom. 2006. Property Rights, Externalities, and Environmental Problems. Chapter 4 in *Environmental and Natural Resource Economics*. Seventh Edition. Boston: Pearson

### **B. Environmental policy instruments**

Tietenberg, Tom. 2006. Economics of Pollution Control. Chapter 15 in *Environmental and Natural Resource Economics*. Seventh Edition. Boston: Pearson.

Tietenberg, Tom. Economic Instruments for Environmental Regulation. *Oxford Review of Economic Policy* 6(1):17-33.

#### *Emissions Trading*

Congressional Budget Office (2003), "Issues in the Design of a Cap-and-Trade Program for Carbon Emissions".

Stavins, Robert N. (1998), "What Can We Learn from the Grand Policy Experiment? Lessons from SO<sub>2</sub> Allowance Trading", *Journal of Economic Perspectives* 12, 69-88.

Kruger, Joe and Billy Pizer (2004), "Greenhouse Gas Trading in Europe: The New Grand Experiment", *Environment* 46, 8-23.

Stavins, R. (2007): A U.S. Cap-and-Trade System to Address Global Climate Change, Harvard University, Discussion Paper 2007-13.

#### *Emissions trading vs taxes*

Congressional Budget Office (2005), "Limiting Carbon Dioxide Emissions: Prices versus Caps".

Parry, Ian and William Pizer. 2007. Emissions Trading versus CO<sub>2</sub> Taxes versus Standards. Washington, DC: Resources for the Future.

*Current Policy Issues*

Stavins, Robert N. 2007. A U.S. Cap-and-Trade System to Address Global Climate Change. Washington, DC: The Brookings Institution.

Metcalf, Gilbert E. 2007. A Proposal for a U.S. Carbon Tax Swap. Washington, DC: The Brookings Institution.

***C. Intertemporal problems (stock pollutants, discounting)***

Schelling, T. (1995), "Intergenerational discounting", Energy Policy 23, 395-401.

Nordhaus, W. (1997), "Discounting in Economics and Climate Change," Climatic Change 37, 315-328.

Newell, R. and W. Pizer (2001), "Discounting the benefits of climate change mitigation. How much does uncertain rates increase valuations?", Pew Center on Global Climate Change.

***D. Decisions under risk and uncertainty***

Kolstad (2000), pp. 220-229

Schneider, Stephen H., B.L. Turner II, H. Morehouse Garriga (1998), "Imaginable surprise in global change science", Journal of Risk Research 1 (2), 165–185.

Viscusi, W.K. (1996), "Economic Foundation of the Current Regulatory Reform Efforts", Journal of Economic Perspectives 10, 119-134.

***E. Cost benefit analysis - Integrated Assessment***

U.S. Environmental Protection Agency. 2000. Guidelines for Preparing Economic Analyses.

Stern, Nicholas (2007), The economics of climate change – The Stern Review, Cambridge University Press, Cambridge. Available at [http://www.hm-treasury.gov.uk/independent\\_reviews/stern\\_review\\_economics\\_climate\\_change/stern\\_review\\_report.cfm](http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm)

**Part 3: Selected Topics in Climate Policy**

***Throughout the semester but in particular during the second half of the semester, we will discuss some current policy issues. Interested students should frequently have a look at newspaper articles, but also at other new publications. Further links will be provided on the website.***

***A. Current U.S. climate policy***

***B. International climate policy (Kyoto and beyond)***

***C. Energy efficiency, energy security, and climate policy***

***D. Adaptation and mitigation – two sides of climate policy***

***E. Climate change, climate policy and the role of agriculture and forestry***

***F. Biofuels – An option to reduce greenhouse gases?***

***G. Carbon Offsets***