15.023-12.848-ESD.128

GLOBAL CLIMATE CHANGE: ECONOMICS, SCIENCE, AND POLICY

SPRING 2008

Room E25-117
Mon: 3-5pm
Wed: 3-4pm

Faculty:
Professor Henry D. Jacoby
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Schedule and Syllabus

Wed., Feb. 6: Introduction and Overview (HJ & RP)

Mon., Feb. 11: Institutions I: Political and Analytical Organizations (HJ)

Climate Change Secretariat (UNFCCC), 2007. *Uniting on Climate: A Guide to the Climate Change Convention and the Kyoto Protocol*, pp. 7-38 [course reader].

Summary for Policymakers, *Climate Change 2007: Synthesis Report*, Intergovernmental Panel on Climate Change, Fourth Assessment Report. [course reader]. (Also skim (http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf) to get an idea of the scope of issues the IPCC deals with.)

Wed., Feb. 13: Review of the Mathematics of Climate Analysis (EL)

Notes distributed in class.

MON., FEB. 18: PRESIDENT'S DAY HOLIDAY

Tues., Feb 19: Climate I: Past Climate, and Gases, Aerosols & Radiation (RP)

Karl, T. and K. Trenberth (2003). Modern Global Climate Change, *Science* **302**, 5 Dec. [course reader].

Prinn, R. (2004). Non-CO_2 Greenhouse Gases, in C. Field and M. Raupach, *The Global Carbon Cycle*, Island press, Washington, D.C., Ch. 9 (pp. 205-216). [course reader].

"Summary for Policymakers," Intergovernmental Panel on Climate Change, Working Group I, Fourth Assessment Report, *Climate Change 2007: The Physical Science Basis*, Cambridge University Press, 2007, pp. 1-17. [course reader]

Andreae, M., C. Jones and P. Cox. (2005). Strong present-day aerosol cooling implies a hot future. *Nature* **435(30)**: 1187-1190. [course reader].

******Distribute Homework Set #1******

Wed., Feb. 20: Economics Primer (TF)

Callan, S.J. and J.M. Thomas (2006). *Environmental Economics and Management*, Chapter 2. 4th ed., Thomson/South-Western Publishing. [course reader]

Kolstad, C. (2000). *Environmental Economics*, Oxford U. Press, Chapter 4 pp. 49-77. [course reader].

Mon., Feb. 25: Climate II: Dynamics of the Atmosphere and Oceans (RP)

Schneider, S. (1992). Introduction to Climate Modeling, in K. Trenberth (ed.), *Climate System Modeling*, Cambridge U. Press, pp. 3-26. [course reader].

Hansen, J., et al. (2005), Earth's Energy Imbalance: Confirmation and Implications, *Science* **308(5727)**: 1431-1435. [course reader].

Penner, J. (2004). The cloud conundrum, *Nature* **432**, 23/30. [course reader].

Wed., Feb. 27: Economics of the Global Commons (TF)

US Congressional Budget Office (2003). *The Economics of Climate Change: A Primer*, Chapter 3. [course reader].

Callan, S.J. and J.M. Thomas (2006). *Environmental Economics and Management*, Chapter 3. 4th edition. Thomson/South-Western Publishing. [course reader]

******Homework Set #1 Due. Distribute Homework Set #2******

Mon., Mar. 3: Economics I: Economic Growth, Technology and GHG Emissions (HJ)

US Congressional Budget Office (2003). *The Economics of Climate Change: A Primer*, Washington DC, Ch. 1, 3 and 4. [course reader; see Feb. 27 location in reader].

Weyant, J. (2001). Economic Models: How They Work & Why Their Results Differ, in M. Claussen (ed.), *Climate Change: Science, Strategies and Solutions*, Pew Center for Global Climate Change, Washington DC. [course reader].

Wed., Mar. 5: Institutions II: The International Climate Negotiations (HJ)

Jacoby, H., and D. Reiner (2005). Getting Climate on Track after The Hague: an Update, R. Wilkinson (ed.), *The Global Governance Reader*, Routledge, New York, Ch.15. [course reader].

Pew Center on Global Climate Change (2007), Thirteenth Session of the Conference of the Parties to the FCCC and Third Sessions of the MOP to the Kyoto Protocol, 3-15 December. [course reader].

Framework Convention on Climate Change, *Bali Action Plan*, Decision -/CP.13, December 2008. (Also skim the COP-13 items at http://unfccc.int/meetings/cop_13/items/4049.php). [course reader].

Mon., Mar. 10: Economics II: The Economics of GHG Emissions Control (HJ)

Pizer, W. (2001). Choosing Price or Quantity Controls for Greenhouse Gases, in M. Toman (ed.) *Climate Change Economics and Policy – An RFF Anthology*, RFF, Washington DC. [course reader]

Ansolobehere, S. et al. (2007). The Role of Coal in Energy Growth and CO_2 Emissions, Chapter 2 in, *The Future of Coal in a Carbon Constrained World*, an interdisciplinary MIT study. [handout]

McKinsey & Co. (2007). Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost?, Executive Summary. [handout]

Jaffe, A., et al. (2001). Energy Efficient Technologies and Climate Change Policies: Issues and Evidence, M. Toman (ed.) *Climate Change Economics and Policy – An RFF Anthology*, RFF, Washington DC. [course reader]

Babiker, M. J. Reilly and H. Jacoby (2000). The Kyoto Protocol and Developing Countries,

Wed., Mar. 12: Introduction to the Toy IGSM (TF & EL)

Notes distributed in class.

Mon., Mar. 17: Climate III: Interaction of Atmosphere, Oceans & Biosphere (RP)

Prinn, R.. et al. (1999). Integrated Global System Model for Climate Policy Assessment: Feedbacks and Sensitivity Studies, *Climatic Change*, Sections 1, 2 and 3. [course reader].

Sokolov, A.P. et al., (2005). The MIT Integrated Global System Model (IGSM) Version 2: Model Description and Baseline Evaluation**,** MIT Joint Program on the Science and Policy of Global Change, Report #124. [course reader].

******Homework Set #2 Due. Distribute Homework Set #3******

Wed., Mar. 19: Analysis of the Benefits of GHG Mitigation (HJ)

Nordhaus, W. and J. Boyer (1999). *Warming the World: Economic Models of Global Warming*, Chapter 4. [course reader].

Economic modeling of climate change impacts, Chapter 6 in *The Stern Review of the Economics of Climate Change*, HM Treasury, 2006. [course reader].

Oppenheimer, M. (2005). Defining Dangerous Anthropogenic Interference: The Role of Science, the Limits of Science, *Risk Analysis* **25(6)**: 1399-1407. [course reader].

MARCH 26-30: SPRING HOLIDAY

Mon., Mar. 31: Economics III: Climate Policy Analysis (HJ)

Nordhaus, W. and J. Boyer (1999). *Warming the World: Economic Models of Global Warming*, Chapter 7. [course reader].

Scenarios of Greenhouse Gas Emissions and Anthropogenic Concentrations: CCSP Synthesis and Assessment Product 2.1, Part A, Executive Summary, 2007. [course reader]

Toth, F. et al. (2002). Exploring Options for Global Climate Policy: A New Analytical Framework, *Environment*, pp.23-33. [course reader].

Wed., Apr. 2: Emissions Trading and Tax Systems (HJ)

Ellerman, A.D., P. Joskow and D. Harrison, Jr. (2003). Emissions Trading in the U.S.: Experience, Lessons and Considerations for Greenhouse Gases, Pew Center for Global Climate Change, Washington DC. [course reader].

Paltsev, S., et al. (2008). Assessment of U.S. GHG Cap-and-Trade Proposals, *Climate Policy*, in press. [handout]

Parry, I. and W. Pizer (2007). Is taxation or cap-and-trade the better strategy for reducing greenhouse emissions, *Regulation*, fall. [course reader]

Mon., April 7: Climate Machine IV: Regional Impacts of Climate Change (RP)

Talbot, D. (2007). Planning for a Climate-Changed World, *Technology Review* (May-June, p. 63-70). [course reader)

National Assessment Synthesis Team, U.S. Global Change Research Program, *Climate Change Impacts in the United States* (2000), pp. 1-37 (Full report available at Lindgren and Dewey Libraries or at http://www.nacc.usgcrp.gov/usgcrp/nacc/.) [course reader].

"Summary for Policymakers," Intergovernmental Panel on Climate Change, Working Group II, Fourth Assessment Report, *Climate Change 2007: Impacts, Adaptation and Vulnerability*, Cambridge University Press, 2007, pp. 1-17. [course reader].

Strove, J. et al. (20080. Arctic Sea Ice Extent Plummets in 2007, *EOS Transactions, AGU*, 89/2. 8 January (pp. 13-14). [course reader]

Tedesco, M. (2007). A New Record in 2007 for Melting in Greenland, *EOS, Transactions, AGU*, 88/39, 25 September (p. 383). [course reader]

Wolff, E. (2003). Whither Antarctic Sea Ice, *Science* 302: 1164. [course reader].

Whitfield, J. (2003). Too Hot to Handle, *Nature* 425: 338-339. [course reader].

Wed., Apr. 9: Review of Methods of Uncertainty Analysis (TF & EL)

Notes distributed in class

******Homework Set #3 Due. Distribute Homework Set #4******

Mon., Apr. 14: Integrated Assm't-I: Sensitivity and Uncertainty Analysis (RP)

Prinn, R. et al. (1999). Integrated Global System Model for Climate Policy Analysis: Feedbacks and Sensitivity Studies, *Climatic Change*, Sections 4 and 5. [course reader].

Webster, M. et al. (2003). Uncertainty Analysis of Climate Change and Policy Response, *Climatic Change* **61(3)**: 295-320. [course reader].

Forest, C., P. Stone and A. Sokolov (2006). Estimated PDFs of climate system properties including natural and anthropogenic forcings, *Geophysical Research Le*tters 33: 1-4. [course reader].

Webster, M. (2003). Communicating Climate Change Uncertainty to Policy-Makers and the Public, *Climatic Change* **61(1-2)**: 1-8. [course reader].

Wed., April 16: Sea Level Rise (TF)

Reading distributed in class.

MON., APRIL 16: PATRIOT'S DAY HOLIDAY

Wed., Apr. 23: Methods for Decision under Uncertainty (MW)

Reading distributed in class.

Mon., Apr. 28: Integrated Assm't-II: Deciding Global Effort & Burden Shares (HJ & MW)

Webster, M., et al. (2008). Learning about Climate Change and Implications for Near-Term Policy, Climatic Change (in press). [course reader]

Aldy, J., and R. Stavins (2007). Introduction: International policy architecture for global climate change, Chapter 1 in Aldy and Stavins (eds.) *Architectures for Agreement: Addressing Global Climate Change in the Post-Kyoto World*, Cambridge U. Press. [course reader].

******Homework Set #4 Due******

Wed., Apr. 30: Climate Change and the Arctic Region (EL)

Bunn. A. et al. (2007). Northern High-Latitude Ecosystems Respond to Climate Change, *EOS Transactions, AGU*, 88/34, 21 August, pp. 333-335.

Arctic Climate Impact Assessment (2004), Impacts of a Warming Arctic (Highlights Brochure), Cambridge University Press, pp. 1-16. [handout]. http://www.acia.uaf.edu/pages/overview.html

Mon., May 5: Climate V: Unresolved Problems in Climate Analysis (RP)

Kerr, R. (2005). Confronting the Bogeyman of the Climate System, *Science* **31**: 432-433. [course reader].

Harvell, C. (2002). Climate Warming and Disease Risks for Terrestrial and Marine Biota, *Science* **296**: 2158-2162. [course reader].

Kerr, R. (2004). A bit of icy Antarctica is sliding toward the sea, *Science* **305**: 1897. [course reader].

Morton, O. (2007). Is this what it takes to save the world?, *Nature* 447, 10 May, (pp. 132-136). [course reader]

Mann, M.E., et al. (2007). Atlantic Tropical Cyclones Revisited, *EOS, Transactions, AGU*, 88/36, 4 September (p. 349). [handout]

Emanuel, K. (2005). Increasing destructiveness of tropical cyclones over the past 30 years. *Nature* **436**: 686-688. [course reader].

Butler, D. (2005) Clear skies raise global-warming estimates, *Nature* **435**: 1142-1143. [course reader]

Wed., May 7: Discussion of Homework Sets, and the Policy Exercise (TF & EL)

Mon., May 12: Student Team Presentations (All + guests)

Wed., May 14: Final Summary and Discussion (All)

Grading:	Homework (15% each)	60%
	Team Project #1	10%
	Team Project #2	25%
	Class Participation	5%