CLIMATE CHANGE ECONOMICS

Cross- elective

Fall 2026

Jindal School of Government and Public Policy

O.P. Jindal Global University

Course Information

Course Duration: 45 Hours
Credit Hours: 4
Meetings: To be decided
Location: To be decided
Prerequisites: 'Microeconomics' and 'Mathematical Methods for Economics'
Equivalent Courses: Environmental Economics, Natural Resource Economics
Exclusive Courses: None

Instructors' Information

Faculty Name – Dr. Priti Agarwal
Biography- Dr. Priti Agarwal is an Associate Professor at the Jindal School of Government and Public Policy, OP Jindal Global University. She completed her Ph.D. in Economics in 2021 from the Centre for International Trade and Development, Jawaharlal Nehru University, New Delhi. She is particularly interested in empirical work pertaining to Sustainable Development, Environmental and Natural Resource Economics.
Email:priti.agarwal@jgu.edu.in
Office: 7 South- 4th Floor, Faculty Office Block
Office Hours: To be decided
Homepage: Dr. Priti Agarwal | O.P. Jindal Global University (jgu.edu.in)

1. Course Description

Climate change is, at its core, an economic challenge. Greenhouse gas emissions have no economic or market value, leading to their excessive production at the expense of global well-being. However, the distinct characteristics of climate change make it challenging to apply standard economic analysis. It is a worldwide challenge that demands unparalleled international collaboration. Pervaded by uncertainty and causing irreversible damages largely, the costs and benefits of mitigating climate change are unevenly distributed across both regions and time.

This course focuses on dissecting the complex challenges of climate change and exploring how economic research has addressed them. We will investigate aspects of climate change's economic impacts, analyze theoretical models, and evaluate climate policies along with their strengths and limitations.

2. Course Intended Learning Objectives

Course Intended Learning Outcomes	Teaching and Learning Activities	Assessments/ Activities
1. Understanding the science and economics of climate change	Lectures, class discussions, presentations	Case studies, assignments, written tests, presentations
2. Economic Modelling of Climate Change	Lectures, class discussions, presentations	Case studies, assignments, written tests, presentations
3. Understanding the climate policy and economic impact of climate change	Lectures, class discussions, presentations	Case studies, assignments, written tests, presentations
4. Climate mitigation and adaptation	Lectures, class discussions, presentations	Case studies, assignments, written tests, presentations

3. Scheme of Evaluation and Grading

a. Climate Data Analysis- 15 percent
b. Research Aptitude Test- 15 percent
c. Mid- Sem Exam- 30 percent
d. Class Participation- 10 percent
e. End-Sem Exam – 30 percent

4. Academic Integrity

Students are expected to abide by all University policies on academic honesty. Do not plagiarize or use AI. 'Examination code of conduct' to be followed during written exams.

5. Keyword Syllabus- climate change economics, environmental and ecological economics, greenhouse gas emissions, climate policy, mitigation and adaptation

6. Course Material

Recommended Textbooks:

- Tol, R. S. J. (2023). *Climate economics: Economic analysis of climate, climate change and climate policy* (3rd ed.). Edward Elgar Publishing, ISBN: 978 1 80220 545 9
- Stern, N. (2006) Stern Review: The Economics of Climate Change. Cambridge University Press, Cambridge: *Chapter 2: Economics, ethics and climate change*

Resource site for Richard Tol's 2014 textbook *Climate Economics: Economic analysis of climate, climate change, and climate policy*.
The new site is on GitHub.
It contains all lecture slides, videos and quizzes
https://sites.google.com/site/climateconomics/
Climate Economics | Economic analysis of climate, climate change, and climate policy

MODULE 1: SCIENCE AND ECONOMICS OF CLIMATE CHANGE (Week 1-3)

Textbook Chapters

- Tol, R. S. J. (2023). *Climate economics: Economic analysis of climate, climate change and climate policy* (3rd ed.). Edward Elgar Publishing, ISBN: 978 1 80220 545 9
  Chapter 1: The Science of Climate Change
  Chapter 2: Emissions Scenarios and Options for Emission Reduction
- Stern, N. (2006) Stern Review: The Economics of Climate Change. Cambridge University Press, Cambridge: *Chapter 2: Economics, ethics and climate change*
- Chapter 2 from FitzRoy, F.R., & Papyrakis, E. (2016). An Introduction to Climate Change Economics and Policy (2nd ed.). Routledge. https://doi.org/10.4324/9781315769318

Research Articles

- IPCC REPORTS
  https://www.ipcc.ch/synthesis-report/
- IPCC, 2007: Summary for Policymakers. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M.Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA
- Climate change will drive dangerous inequality — JAMES K. BOYCE
- Aldy, J. E., & Stavins, R. N. (2012). Climate negotiators create an opportunity for scholars. *Science, 337*(6098), 1043–1044.

MODULE 2: ECONOMIC MODELLING OF CLIMATE CHANGE (Week 4-6)

Textbook Chapters

- Perman, R., Ma, Y., McGilvary, J. and M. Common (2003), 'Chapter 16: Stock Pollution Problems' in *Natural Resource and Environmental Economics, 3rd Edition*
- WTO (2022) World Trade Report 2022: Climate change and international trade, World Trade Organization.
  Chapters:
  C. The trade implications of a low-carbon economy- page 50
  E. The decarbonisation of international trade- page 98

Research Articles

- Gupta, S. (2020). Has economics caught up with climate science? *Ecology, Economy and Society – The INSEE Journal*, 3(1), 11–30. https://doi.org/10.37773/ees.v3i1.86
- Bretschger, L., & Karydas, C. (2019). Economics of climate change: introducing the Basic Climate Economic (BCE) model. *Environment and Development Economics*, *24*(6), 560–582. doi:10.1017/S1355770X19000184
- Nordhaus, William D. (2008). *A Question of Balance*. Yale University Press.
- Nordhaus, William D. (2010). "Economic aspects of global warming in a post-Copenhagen environment," *PNAS (Proceedings of National Academy of Sciences)*, 107(26):11721-11726, June 29 (and Supporting Information).

- Nordhaus, W. D., & Yang, Z. (1996). A Regional Dynamic General-Equilibrium Model of Alternative Climate-Change Strategies. *The American Economic Review*, *86*(4), 741–765. http://www.jstor.org/stable/2118303
- Hope, C. (2006). The marginal impact of CO_2 from Page2002: An integrated assessment model incorporating the IPCC's five reasons for concern. *The Integrated Assessment Journal, 6*(1), 19–56.
- Dietz, S., Hope, C., & Patmore, N. (2007). Some economics of 'dangerous' climate change: Reflections on the Stern Review. *Global Environmental Change, 17*(3–4), 311–325. https://doi.org/10.1016/j.gloenvcha.2007.05.008
- Nordhaus, W. (2007). Critical assumptions in the Stern Review on climate change. *Science, 317*(5835), 201–202
- Stavins, R. N. (2011). The problem of the commons: Still unsettled after 100 years. *American Economic Review, 101*(1), pp. 81-108, https://www.jstor.org/stable/41038783
- Stern, N., & Taylor, C. (2007). Climate change: Risk, ethics, and the Stern review. *Science, 317*(5835), 203–204, Climate Change: Risk, Ethics, and the Stern Review | Science
- Stavins, R. N., & Stowe, R. C. (Eds.). (2016). *The Paris Agreement and beyond: International climate change policy post-2020*. Harvard Project on Climate Agreements, Belfer Center.
- Nordhaus, W. D. (2007). A review of the Stern Review on the economics of climate change. *Journal of Economic Literature, 45*(3), 686–702. https://doi.org/10.1257/jel.45.3.686
- Stern, N. (2008). The economics of climate change. *The American Economic Review, 98*(2), 1–37. http://www.jstor.org/stable/29729990

MODULE 3: CLIMATE POLICY (Week 7-9)

Textbook Chapters

- Tol, R. S. J. (2023). *Climate economics: Economic analysis of climate, climate change and climate policy* (3rd ed.). Edward Elgar Publishing, ISBN: 978 1 80220 545 9
  Chapter 4: Policy Instruments for Emission Reduction
  Chapter 9: Optimal Climate Policy
- Stern, N. (2006) Stern Review: The Economics of Climate Change. Cambridge University Press, Cambridge:
  Chapter 14: Harnessing markets for Mitigation - The Role of Taxation and Trading
  Chapter 13: Towards a goal for climate change policy.

Research Articles

- Bodansky, D. M., Hoedl, S. A., Metcalf, G. E., & Stavins, R. N. (2015). Facilitating linkage of climate policies through the Paris outcome. *Climate Policy, 16*(8), 956–972. https://doi.org/10.1080/14693062.2015.1069175
- Can Carbon Pricing Address Climate Justice? — JAMES K. BOYCE
- Newell, R. G., Pizer, W. A., & Raimi, D. (2013). Carbon Markets 15 Years after Kyoto: Lessons Learned, New Challenges. *The Journal of Economic Perspectives*, *27*(1), 123–146. http://www.jstor.org/stable/41825465
- Hassler, J., Krusell, P., & Nycander, J. (2016). Climate policy. *Economic Policy, 31*(87), 503–558. https://doi.org/10.1093/epolic/eiw007

- Olmstead, S. M., & Stavins, R. N. (2012). Three key elements of a post-2012 international climate policy architecture. *Review of Environmental Economics and Policy, 6*(1), 65–85. https://doi.org/10.1093/reep/rer018
- **Schmalensee, R., & Stavins, R. N. (2017).** Lessons learned from three decades of experience with cap and trade. *Review of Environmental Economics and Policy, 11*(1), 59–79.
- Stavins, Robert N. "The Future of U.S. Carbon-Pricing Policy." *Environmental and Energy Policy and the Economy*, volume 1, pp. 8-64. University of Chicago Press, 2020. [*Read Pages 8-29, 33-43, 47-52*]
- Pindyck, Robert. (2015). "The use and misuse of models for climate policy." Available at: http://web.mit.edu/rpindyck/www/Papers/PindyckClimateModels2015.pdf
- **Schmalensee, R., & Stavins, R. N. (2013).** The SO_2 allowance trading system: The ironic history of a grand policy experiment. *Journal of Economic Perspectives, 27*(1), 103–122.
- Environmental Justice and Carbon Pricing: Can They Be Reconciled? - Boyce - 2023 - Global Challenges - Wiley Online Library
- Carbon Dividends and the Green New Deal - The American Prospect

MODULE 4: ECONOMIC IMPACT OF CLIMATE CHANGE (Week 10-12)

Textbook Chapters

- Tol, R. S. J. (2023). *Climate economics: Economic analysis of climate, climate change and climate policy* (3rd ed.). Edward Elgar Publishing, ISBN: 978 1 80220 545 9
  Chapter 5: Impacts and Valuation
  Chapter 6: Impacts of Climate Change
  Chapter 7: Climate and Development
  Chapter 10: Discounting
- Stern, N. (2006) Stern Review: The Economics of Climate Change. Cambridge University Press, Cambridge
  Chapter 3: How climate change will affect people around the world
  Chapter 4: Implications of climate change for development
  Chapter 6: Economic modelling of climate change impacts

Research Articles

- Wagner, G., & Weitzman, M. L. (2015). Climate Shock: The Economic Consequences of a Hotter Planet (REV-Revised). *Princeton University Press.* https://doi.org/10.2307/j.ctv7h0rzq- Chapter 3 on fat tails
- Dell, M., Jones, B. F., & Olken, B. A. (2012). Temperature shocks and economic growth: Evidence from the last half century. *American Economic Journal: Macroeconomics, 4*(3), 66–95. https://doi.org/10.1257/mac.4.3.66
- Aldy, Joseph, Matthew Kotchen, Robert Stavins, and James Stock. "Keep Climate Policy Focused on the Social Cost of Carbon." *Science*, Policy Forum Insights, Volume 373, Issue 6557, August 20, 2021.
- Nordhaus, W. D. (2017). Revisiting the social cost of carbon. *Proceedings of the National Academy of Sciences of the United States of America, 114*(7), 1518–1523. https://doi.org/10.1073/pnas.1609244114

- van den Bijgaart, I., Gerlagh, R., & Liski, M. (2016). A simple formula for the social cost of carbon. *Journal of Environmental Economics and Management, 77*, 75–94. https://doi.org/10.1016/j.jeem.2016.01.005
- Nordhaus, W. (2014). Estimates of the social cost of carbon: Concepts and results from the DICE-2013R model and alternative approaches. *Journal of the Association of Environmental and Resource Economists, 1*(1), 273-312. https://doi.org/10.1086/676035
- van den Bergh, J. (2015). Monetary valuation of the social cost of CO_2 emissions: A critical survey. *Ecological Economics, 114*, 33–46. https://doi.org/10.1016/j.ecolecon.2015.03.015

MODULE 5: MITIGATION AND ADAPTATION (Week 13-15)

Textbook Chapters

- Tol, R. S. J. (2023). *Climate economics: Economic analysis of climate, climate change and climate policy* (3rd ed.). Edward Elgar Publishing, ISBN: 978 1 80220 545 9
  Chapter 8: Adaptation Policy
- Stern, N. (2006) Stern Review: The Economics of Climate Change. Cambridge University Press, Cambridge
  Chapter 8: The Challenge of Stabilization
  Chapter 9: Identifying the Costs of Mitigation
  Chapter 18: Understanding the Economics of Adaptation
  Chapter 20: Adaptation in the Developing World

Research Articles

- Stavins, Robert N., and Robert C. Stowe, eds. "The Paris Agreement and Beyond: International Climate Change Policy Post-2020." Cambridge, Mass.: Harvard Project on Climate Agreements, October 2016.
- Aldy, J. E., Krupnick, A. J., Newell, R. G., Parry, I. W. H., & Pizer, W. A. (2010). Designing climate mitigation policy. *Journal of Economic Literature, 48*(4), 903–934.

Additional Resources (Learning Videos)

- Jayachandran, Seema. 2018. Thinking Globally to Mitigate Climate Change: Paying Local Communities to Protect Forests. J-Pal. https://www.youtube.com/watch?v=_MvE7GVrOLc&feature=youtu.be
- Yale Climate Opinion Map. https://climatecommunication.yale.edu/visualizations-data/ycom-us/
- "Saving the Amazon" Documentary
- "The Climate Clubs Solution" lecture by William Nordhaus
- What Role Should Economists Play in Climate Policy? — JAMES K. BOYCE
- Environmental Justice and Carbon Pricing — JAMES K. BOYCE
- Interview with James K. Boyce: 'The Case for Carbon Dividends as Tax Justice' with Q&A
- Climate Change in an Unequal World with James K. Boyce
- #CCL2020 June Conference: Carbon Pricing as "Rent" - An Economist & Journalist Discuss
- RNN: The Case for Carbon Dividends — JAMES K. BOYCE
- RNN: Can Carbon Pricing Reduce CO2 Emissions? — JAMES K. BOYCE