Instructor Information

- Alexander Heil, PhD
- Email: ah5701@nyu.edu
- Phone: 347-616-9039
- Office Hours: By Appointment only

Course Information

- Class Meeting Times: Wednesdays; 4:55-6:35pm
- Class Location: 60 Fifth Avenue, Room 110 Loc: Washington Square

Course Prerequisites

The prerequisites are CORE-GP 1018 Microeconomics and (concurrently) CORE-GP 1011 Statistical Methods—or the equivalent classes.

Course Description

This course attacks the problem of climate change from the perspective of economics. Topics covered include benefit-cost-analysis, the social cost of carbon; market-based and prescriptive policy solutions; economic efficiency vs. distributional equity; electric power; energy efficiency; and transportation. Classes feature lecturing but prioritize student participation throughout. Course assignments are designed to give practice in a variety of tasks relevant for students' personal and professional lives. Through these activities, students will:

1) Become knowledge in the area of climate economics and policy
2) Develop a versatile economic intuition, for use in any environmental professional setting
3) Become more comfortable with quantitative thinking and analysis
4) Improve their ability to communicate, translate, and wield rhetoric in the highly divisive scientific debate about how to respond to the changing climate.
Course and Learning Objectives

The course has three goals:

#1 build our environmental economic policy toolkit and know when to apply which tool to real world problems and issues;
#2 communicate the results of our analyses in plain English to experts and lay audiences;
#3 make better-informed environmental policy decision, all while distinguishing between positive analyses and normative judgements.

Three presentations plus responses and the group project will build on and reinforce class discussions.

Required Readings

There are two required texts for the class: Richard Tol's Climate Economics, Second Edition (Edward Elgar 2019), referred to as “CLIMATE”.

The other text is Nathaniel Keohane and Sheila Olmstead’s Markets and the Environment, Second Edition (Island Press, 2016), referred to as “MARKETS”.

There will be several other materials, ranging from lecture notes/slides to peer-reviewed academic papers to news articles, to brief excerpts from other books. All of those will be available online via the course website.

Beginning with week 2 of the course, come prepared to class having done the readings for the day, including any lecture notes/slides. We will use class times to review the most important concepts and then discuss the merits and demerits of the tools and applying them to real-world situations.

There is a LOT of research in the climate mitigation and adaptation space. The reading list is a starting point that is designed to identify some of the key issues, not necessarily always the most recent estimates of climate change impacts. We will use additional resources in class and keep our weekly discussions as current as possible.

Useful Websites

Resources for the Future (RFF): https://www.rff.org/topics/
Energy Information Administration (EIA): https://www.eia.gov/environment/
Center for Climate and Energy Solutions: https://www.c2es.org/
Intergovernmental Panel on Climate Change: http://www.ipcc.ch/
UNFCCC Paris Agreement: https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement
International Energy Agency: https://www.iea.org/
US Environmental Protection Agency: https://www.epa.gov/climate-change
International Monetary Fund: https://www.imf.org/en/Topics/climate-change

Assessment Assignments and Evaluation

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<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>%</th>
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<tbody>
<tr>
<td>Homework: Presentations &amp; Response</td>
<td>Three presentations plus response, 5% each. The three presentations are designed to be useful and applicable to your personal lives and professional careers. They are a maximum of five minutes in length and will be uploaded to Brightspace both as an assignment as well as a posting in a discussion forum for everyone to view. These presentations will be: 1) The response to a reporter by you, the climate advisor to the mayor, on what the three most important economic issues are when it comes to climate mitigation policies, 2) The response to a reporter by you, the climate advisor to the mayor, on what the three most important steps people can take in their personal lives to combat adverse climate change impacts, and 3) The response to a reporter by you, the climate advisor to the mayor, on what role technology plays in the challenge to promote growth as well as environmental preservation. Your responses need to incorporate some of the economic principles covered in the course! You will also review other students’ presentations and provide a written response to one of them in the Brightspace discussion forum.</td>
<td>15%</td>
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| Group project                  | In groups, you will explore, research, and analyze an economic policy topic that is directly relevant to climate economics. Further guidance will be provided in Brightspace and in class.  
  • Project scope memo – 5%  
  • Project Presentation – 10%  
  • Project Paper – 20% | 35%|
| Midterm exam                   | Exam with short answer questions, limited numerical applications, and (brief) essay questions.                                                                                                | 20%|
**Final exam**  
Exam with short answer questions, limited numerical applications, and (brief) essay questions.  

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<thead>
<tr>
<th>Participation</th>
<th>Actively engage with the readings and participate in class discussions.</th>
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<tbody>
<tr>
<td>Total</td>
<td>10%</td>
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**Course Overview**

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<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Class topics</th>
<th>Assignments</th>
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<tbody>
<tr>
<td>1</td>
<td>January 25</td>
<td>Introduction &amp; Climate Science</td>
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<td>2</td>
<td>February 1</td>
<td>Cost of Climate Change</td>
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<td>3</td>
<td>February 8</td>
<td>Benefit-Cost Analysis</td>
<td>Everyone assigned to a group</td>
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<td>4</td>
<td>February 15</td>
<td>Valuation of Benefits/Costs</td>
<td>Presentation #1</td>
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<td>5</td>
<td>February 22</td>
<td>Social Cost of Carbon</td>
<td>Response #1</td>
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<td>6</td>
<td>March 1</td>
<td>Renewable and non-renewable Resources</td>
<td>Project scope memo</td>
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<td>7</td>
<td>March 8</td>
<td>MIDTERM</td>
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<td>8</td>
<td>March 15</td>
<td>SPRING BREAK</td>
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<tr>
<td>9</td>
<td>March 22</td>
<td>Environmental Policy: Economics</td>
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<tr>
<td>10</td>
<td>April 5</td>
<td>Global Climate Policy</td>
<td>Response #2</td>
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<tr>
<td>11</td>
<td>April 12</td>
<td>Industry focus: Built Environment, Transportation</td>
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<td>12</td>
<td>April 19</td>
<td>Industry focus: Food</td>
<td>Presentation #3</td>
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<td>13</td>
<td>April 26</td>
<td>Resilience Investments</td>
<td>Response #3</td>
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<td>14</td>
<td>May 3</td>
<td>Course Summary &amp; Presentations</td>
<td>Group Presentations</td>
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<td></td>
<td>TBD</td>
<td>FINAL EXAM</td>
<td>Group Paper</td>
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Detailed Course Overview

WEEK 1: Introduction & The Science of Climate Change

- **Tools/concepts:** Introduction to the science of global temperatures and different future pathways

Readings
1. CLIMATE, Chapter 1 and 2

WEEK 2: The Cost of Climate Change

- **Tools/concepts:** Estimates of climate change impacts & introduction to benefit-cost analyses

Readings
1. CLIMATE, Chapter 3
2. MARKETS, pp. 11-34, 80-90: Chapter 2 "Economic Efficiency and Environmental Protection" and Chapter 5 "Market Failures in the Environmental Realm", the first two subsections: “Externalities” and "Public Goods.”

WEEK 3: Benefit Cost Analysis as a Tool for Policy

- **Tools/concepts:** Negative externalities, net-present value (NPV) analysis, BCA, and some alternative decision criteria

Readings
1. CLIMATE, Chapter 10 & 11
2. MARKETS, pp. 35-68: Chapter 3 “The Benefits and Costs of Environmental Protection.”

WEEK 4: Valuating the benefits and costs of environmental protection

- **Tools/concepts:** Revealed preference methods, stated preference (contingent valuation), benefit transfer, Value of a Statistical Life (VSL)
- **Deliverable:** Presentation #1
Readings

1. CLIMATE, Chapter 5 & 12
2. MARKETS, pp. 48-53: (re-read) Chapter 3’s subsection on “Evaluating the Benefits”

WEEK 5: The “optimal” carbon price: Social Cost of Carbon

- **Tools/concepts:** Economic optimality, the limits of BCA
- **Deliverable:** Response #1

Readings

1. CLIMATE, Chapter 6

WEEK 6: Non-renewable and renewable resources

- **Tool/concept:** Hotelling Rule, Public goods, tragedy of the commons
- **Deliverables:** Project Scope Memo

Readings

1. MARKETS, pp. 99-112: Chapter 6, “Managing Stocks: Natural Resources as Capital Assets”
3. MARKETS, pp. 184-189: Chapter 9’s subsection on “Market-based instruments for managing natural resources.”
4. Covert, Thomas, Michael Greenstone and Christopher R. Knittel. "Will We Ever Stop Using Fossil Fuels?" Journal of Economic Perspectives 30(1), 2016:

**WEEK 7: in-class MIDTERM EXAM**

**WEEK 8: Economics of pollution control**

- **Tools/concepts:** Negative externalities, efficiency, cost-effectiveness, domestic instrument choice (under certainty)

**Readings**

1. MARKETS, pp. 138-161 and 166: Chapter 8, “Principles of Market-Based Environmental Policy,” except for subsection on “Setting Prices versus Setting Quantities”

2. MARKETS, pp. 167-198: Chapter 9, “The Case for Market-Based Instruments in the Real World” (Note that pp. 184-189, “Market-based instruments for managing natural resources” covers renewable resources, from week 6.)


**WEEK 9: Optimal Policy Choices: Prices/Subsidies vs. Quantities**

- **Tool/concept:** Instrument choice under uncertainty; experience with economic policy instruments

- **Deliverable:** Presentation 2

**Readings**

1. MARKETS, pp. 162-166: Chapter 8’s subsection on “Setting Prices versus Setting Quantities”


**WEEK 10: Global (warming) problem, global solution**

- **Tool/concept:** International policy choice, game theory of climate negotiations
- **Deliverable:** Response Presentation 2

**Readings**

1. CLIMATE, Chapter 13
4. Fabre, Adrien and Gernot Wagner, “Risky geoengineering option can make ambitious climate mitigation agreement more likely,” *NYU Wagner Research paper* (9 December 2019).

**WEEK 11: Industry Focus: Built Environment & Transportation**

- **Tool/concept:** Case studies and policy approaches for decarbonization

**Readings**


**WEEK 12: Industry Focus: Food & Energy**

- *Tool/concept*: Case studies and policy approaches for decarbonization
- *Deliverable*: Presentation 3

**Readings**

1. Benjamin K. Sovacool, Morgan Bazilian, Steve Griffiths, Jinsoo Kim, Aoife Foley, David Rooney, Decarbonizing the food and beverages industry: A critical and systematic review of developments, sociotechnical systems and policy options, Renewable and Sustainable Energy Reviews, Volume 143, 2021, 110856, ISSN 1364-0321
2. IEA (2022), Renewables 2022, IEA, Paris https://www.iea.org/reports/renewables-2022, License: CC BY 4.0

**WEEK 13: Resilience**

- *Tool/concept*: Sustainability, green accounting, technology progress
- *Deliverable*: Response Presentation 3

**Readings**

1. CLIMATE, Chapter 8

**WEEK 14: Course Summary**

- *Tool/concept*: Review & wrap-up

**Readings**

1. CLIMATE, Chapter 15
2. En-ROADS Climate Change Solutions Simulator, [www.en-roads.org](http://www.en-roads.org) [Explore the tool]
NYU Brightspace

All announcements, resources, and assignments will be delivered through the NYU Brightspace site.

Academic Integrity

Academic integrity is a vital component of Wagner and NYU. All students enrolled in this class are required to read and abide by Wagner’s Academic Code. All Wagner students have already read and signed the Wagner Academic Oath. Plagiarism of any form will not be tolerated and students in this class are expected to report violations to me. If any student in this class is unsure about what is expected of you and how to abide by the academic code, you should consult with me.

Henry and Lucy Moses Center for Students with Disabilities at NYU

Academic accommodations are available for students with disabilities. Please visit the Moses Center for Students with Disabilities (CSD) website and click on the Reasonable Accommodations and How to Register tab, or call or email CSD at (212) 998-4980 or mosescsd@nyu.edu for information. Students who are requesting academic accommodations are strongly advised to reach out to the Moses Center as early as possible in the semester for assistance.

NYU’s Calendar Policy on Religious Holidays

NYU’s Calendar Policy on Religious Holidays states that members of any religious group may, without penalty, absent themselves from classes when required in compliance with their religious obligations. Please notify me in advance of religious holidays that might coincide with exams to schedule mutually acceptable alternatives.