Thursdays, 2:00-4:30, Warren Weaver Hall 1314

Instructor
Edwin Gerber  (gerber@cims.nyu.edu)
Office Hours: Wednesday 2-3 pm and Thursday 1-2 pm, Warren Weaver Hall 911

Course Description

Your time in high school was an exceptional period for our planet: 2015, 2016, 2017, and 2018 were the four warmest years in recorded history. It is likely the hottest the Earth has ever been since the last interglacial period 125,000 years ago. The first predictions of human induced global warming were made over a century ago, but the topic remains controversial despite the fact that the world has warmed almost 2 degrees Fahrenheit over the intervening years. In this seminar, we will investigate observational evidence as well as the physical and mathematical foundations upon which forecasts of future climate are based. What are the key uncertainties in the predictions, and what steps are required to reduce them? We will find that it is not the science of global warming that is controversial, but rather, what to do about it.

Our personal and collective response to global warming is a “trillion dollar” question: how can we ensure the prosperity of all people on Earth, while at the same time avoid dangerous interference with our climate system? To answer this, we must weigh the costs of taking action today versus responding to potential consequences tomorrow, and come to grips with the ethical implications of the fact that those who benefit from the use of fossil fuels are not the ones who will bear the costs. We must also consider other solutions: could we intervene in the climate system in other ways to offset the impact of our greenhouse gas emissions?

Armed with a scientific and policy background, students will conduct a research project on the response to global warming – delving into the details of climate engineering, alternate energy, psychology, ethics, and/or economics. You have a chance to enter the debate, and perhaps even contribute to the solution!

Required Textbooks


Additional resources will be posted on the course webpages as the semester progresses.

https://edwinpgerber.github.io/teaching/2019-fall-teaching-1
Class Expectations

Be prepared for robust reading and writing assignments. Over the course of the semester you will work through 400 pages of textbook material, 3 scientific reports, and at least 5 peer reviewed scientific studies, in addition to a number of news articles. You will be expected to analyze and challenge these texts, take part in and lead class discussions, and conduct a substantial research project. Given the politicized nature of the climate debate, it’s critical to develop a healthy sense of skepticism. That’s right, being skeptical is especially important for this class! Any scientific and policy claim should be backed up with evidence and sound reasoning. Unfortunately skepticism is sometimes confused with ignorance, particularly in the case of so-called “climate skeptics.” It’s equally important to give weight to all the facts and arguments, and be willing to alter one’s view as the situation demands.

Course Requirements

1. Attendance is mandatory. Absences will be excused only in the case of an emergency, illness, religious observance, or officially sanctioned university event. If you are ill or cannot possibly make it to class, please e-mail me ahead of time. I appreciate that there are certain situations (such as a family emergency) when it is not possible to contact me in advance; in this instance, please contact as soon as reasonable and we’ll work things out. Given that our course meets just once a week, you are allowed at most one unexcused absence. After that, each additional unexcused absence will lead to a 1/3 letter grade reduction of your final grade (that is, a A to A-, A- to B+, etc.). Please let me know in advance if you anticipate that religious commitments or your athletic schedule may lead to more than one or two absences, so we can ensure that you don’t fall behind in the course.

2. Class participation is an integral part of the course. For most meetings, two students will be responsible for leading part of the discussion. On that day, the you will be responsible for preparing a 10-15 minute presentation on what you think are the key ideas of the reading assigned for that day. You can also raise any questions or issues about the reading that are confusing or unclear.

3. Homework. Each week I’ll assign a set of questions concerning the reading for the next week. They will be due by 12 noon each Thursday before class. These are chiefly to get you thinking creatively about the text. You will submit your responses to the course’s NYU Classes webpage.

4. All students will conduct two course projects, detailed in the next section. The first will consist of a 1-2 page proposal and a 6-8 page essay due during the middle of the semester. The second will include a 1-2 page proposal and then a final paper or website of length 12-16 pages (or equivalent, for web documents) to be completed
by the last class. You’ll also present the topic of your final paper to the rest of the class at the end of the semester. For both assignments we’ll divide the class into peer reading groups to help evaluate and improve your writing.

Course Projects
Over the course of the semester you will be complete two papers. In the first you will focus on a scientific topic related to climate change. The second is a longer paper where you explore an element of climate change policy. You’ll also present the topic of your final paper to the rest of the class. To encourage you to get started, you will need to formally propose the topics for your papers well before they are due.

1) Science Paper, 6-8 pages. **Topic proposal (1 pages plus bibliography of sources)** due September 26, first draft due October 10, final draft due October 24. In this paper, you will explore a scientific issue related to climate change. You must read and discuss at least one peer reviewed scientific paper, including other references as appropriate. I will help you focus in on a science paper, based on your topic proposal. The first draft is due early so that you can get feedback from your peers and myself. Possible topics include: feedbacks that amplify or reduce climate perturbation, the details of a particular anthropogenic forcing on the climate, or the response of part of the natural ecosystem to climate forcing.

2) Policy paper, 12-16 pages. **Topic proposal + outline (1-2 pages, plus bibliography) due Nov. 14, oral presentation on December 7 and 12, final draft due last day of classes, Friday December 13.** The goal of the final project is to explore a policy related issue involving climate change. As with your first paper, you must document all your source materials, which must include at least two recent peer reviewed scientific or economic studies. Possible ideas to explore include a particular strategy to (a) limit or mitigate anthropogenic forcing of the climate (b) adapt society to a changed climate, or (c) use geoengineering to limit adverse effects of climate change. While climate change is global, you are encouraged to focus locally in. For example, in terms of reducing emissions or adapting, what should New York City (or even NYU) do?
Disability Disclosure Statement

Academic accommodations are available for students with disabilities. The Moses Center website is www.nyu.edu/csd. Please contact the Moses Center for Students with Disabilities (212-998-4980 or mosescsd@nyu.edu) for further information. Students who are requesting academic accommodations are advised to reach out to the Moses Center as early as possible in the semester for assistance.

Grade Policy

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<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Class Discussion and Quizzes</td>
<td>10%</td>
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<tr>
<td>Weekly written homework</td>
<td>15%</td>
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<tr>
<td>Mid-term Research Paper</td>
<td>25%</td>
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<tr>
<td>Policy Paper Topic Proposal</td>
<td>10%</td>
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<td>Policy Presentation</td>
<td>10%</td>
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<tr>
<td>Policy Paper</td>
<td>30%</td>
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**Tentative Course Schedule**

The pages to read each week are listed in brackets; † denotes the that this reading is at the density of scientific journal article or scientific text book. Over the course of the semester you will chose 3 additional scientific articles to read and digest in support of the two papers.

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Readings</th>
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<tbody>
<tr>
<td>Sept 5</td>
<td>Introduction</td>
<td>The Climate of Man (+ updates)* [36†]</td>
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<tr>
<td>Sept 12</td>
<td>The Anthropocene</td>
<td>Steffen et al. (2011)* [26†]</td>
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<td>Sept 19</td>
<td>Radiation Basics + Layer Model</td>
<td>Archer 1–3 [28†]</td>
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<td>Sept 26</td>
<td>Bullshit + Greenhouse Gases</td>
<td>Frankfurter, Archer 4, Walker 3 [97+14†]</td>
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<td>Oct 3</td>
<td>Atmospheric Structure</td>
<td>Archer 5, Walker 1 [23+14†]</td>
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<td>Oct 10</td>
<td>Peer review + Circulation</td>
<td>Archer 6, Walker 4 [41+16†]</td>
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<td>Oct 17</td>
<td>Climate Feedback and Carbon</td>
<td>Archer 7-8 [30†]</td>
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<tr>
<td>Oct 24</td>
<td>Fossil Fuels and Carbon Cycle</td>
<td>Archer 9-10 [30†]</td>
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<td>Nov 7</td>
<td>OneNYC: What is New York City Doing about Climate Change?</td>
<td>1.5°C: Aligning New York City with the Paris Climate Agreement [63]</td>
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<td>Nov 14</td>
<td>Evidence of Change</td>
<td>Archer 11, IPCC Report* [36†]</td>
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<td>Nov 21</td>
<td>The Climate Forecast</td>
<td>Archer 12, IPCC Report* [31†]</td>
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<td>Nov 28</td>
<td>Thanksgiving - no class!</td>
<td>Turkey (or Tofurky?)</td>
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<td>Dec 6</td>
<td>Student Presentations</td>
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<td>Dec 13</td>
<td>Presentations + The Ozone Hole</td>
<td>Walker 5, Ozone Report* [41+20†]</td>
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*To be posted on the course webpage / distributed via e-mail.

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