



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

### **Instructor**

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Office Hours: tbd, Warren Weaver Hall 911

### **Course Description**

2015 was the hottest year in recorded history, 0.29 degrees Fahrenheit warmer than the previous record, set just the year before. 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 a degree and half over the intervening years. Climate change provokes strong opinions not only because of the environmental, economic, and political implications, but also because it injects itself into our daily lives each time we flip a switch, decide what's for dinner, or interact with a screen.

In this seminar, we 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? What are the costs of taking action today, or responding to potential consequences tomorrow? Could we intervene in the climate system itself to offset the impact of our greenhouse gas emissions? Armed with this scientific background, students then conduct their own research project on the policy of climate change, giving them a chance to enter the debate, and perhaps even contribute to the solution.

### **Required Textbooks**

Archer, David: 2012, *Global Warming: Understanding the forecast (2nd Edition)*, John Wiley and Sons, 203 pp.

Frankfurt, Harry G.: 2005, *On Bullshit*, Princeton University Press, 67 pp.

Walker, Gabrielle: 2007, *An Ocean of Air*, Houghton Mifflin Harcourt, 288 pp.

Additional resources will be posted on the course webpages as the semester progresses. Below are a few *optional* textbooks that you might also find useful. They are not required — no need to order them, as you could likely access through libraries if needed.

Dessler, Andrew E., 2012, *Introduction to Modern Climate Change*, Cambridge University Press, 238 pp.

Weart, Spencer: 2008 *The Discovery of Global Warming*, Harvard University Press, 230 pp.

Weaver, Andrew and Edward Parson, 2006, *The Science and Politics of Global Climate Change, A Guide to the Debate*, Cambridge University Press, 190 pp.

## **Class Expectations**

As this is a honors level seminar, you should be prepared for more robust reading and writing assignments. You will be expected to analyze and challenge various 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." Its 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 9 am 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 29, first draft due October 13, final draft due October 27.** 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. 17, oral presentation on December 8, final draft due last day of class, December 15.** 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 the final paper. For example, in terms of reducing emissions or adapting, what should New York City (or even NYU) do?

## Grade Policy (approximate)

Class Discussion and Quizzes	10%
Weekly written homework	15%

Mid-term Research Paper	25%
Policy Paper Topic Proposal	10%
Policy Presentation + Discussion	10%
Policy Paper	30%

**Tentative Course Schedule**

Week	Topics	Readings
Sept 8	Introduction	The Climate of Man*
Sept 15	Radiation Basics + Layer Model	Archer 1-3
Sept 22	Bullshit + Greenhouse Gases	Frankfurter, Archer 4, Walker 3
Sept 29	Atmospheric Structure	Archer 5, Walker 1
Oct 6	Atmospheric Circulation	Archer 6, Walker 4
Oct 13	Peer review + Climate Feedback	Archer 7
Oct 20	Carbon on Earth + Fossil Fuels	Archer 8-10
Oct 27	Evidence of Change	Archer 11, IPCC Report*
Nov 3	The Climate Forecast	Archer 12, IPCC Report*
Nov 10	Climate Policy	Archer 13, Pacala+Socolow 04
Nov 17	OneNYC: What is New York City Doing about Climate Change?	To be announced.
Nov 24	Thanksgiving - no class!	Turkey (or tofurky?)
Dec 1	The Anthropocene	Steffen et al. (2011)*
Dec 8	Student Presentations	
Dec 15	The Ozone Hole: Problem solved?	Walker 5, Ozone Report*

\*To be posted on the course webpage / distributed via e-mail.