Climate Change: Science, Economics, and Policy (ECON/ENVI 235)

Macalester College – Fall 2022

Class meetings: TTh 9.40 am – 11.10 am, OLRI 301

Instructors:

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Office hours: Wed. and Thurs., 1:30 – 2:30pm, and by appointment via email

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In-person and Zoom office hours, both by appointment only. See Sarah's appointment calendar, and please take care to note whether you are signing up for an in-person or Zoom appointment.

Preceptor:

Zak Yudhishthu — zyudhish@macalester.edu; Office hours TBA

Course description

The causes and effects of climate change are inextricably linked with the global economy. The combustion of fossil fuels produces carbon dioxide, which traps energy near Earth's surface and leads to warmer average global temperatures. The combustion of fossil fuels also forms the backbone of the modern economy, fueling cars, power plants, and everything in between. This team-taught course will provide a framework in which to consider the costs and benefits of fossil fuel consumption in the present, but also over the coming decades and centuries. We will use concepts from climate science and environmental economics to help evaluate existing and proposed policy interventions designed to reduce fossil fuel consumption, and we will similarly consider possible technological solutions to slow or even reverse climate change. We will spend a significant amount of time exploring how the preceding topics factor into Integrated Assessment Models. Governments and NGOs use these models to combine scientific and socioeconomic information to predict the outcomes of various climate and policy scenarios. These are the state of the art in climate science, economics, and policy; students will be exposed to several of the most commonly used models and to research from their critics.

Goals for students

By the end of this course, students should be able to

- Explain the basic principles of climate science and economics to a non-technical audience
- Understand the costs and benefits of, prospects for, and obstacles to potential climate change policies
- Use an Integrated Assessment Model to simulate changes in natural and economic conditions and to analyze the relative effectiveness of policies intended to reduce greenhouse gases

- Critique Integrated Assessment Models and their alternatives using a number of scientific and economic criteria
- Communicate clearly and effectively through written presentations of ideas

Course texts and readings

Archer, David. Global Warming: Understanding the forecast, 2nd ed. Hoboken, NJ: Wiley, 2011.
Nordhaus, William. The Climate Casino: Risk, Uncertainty, and Economics for a Warming World. New Haven, CT: Yale University Press, 2013.
Various other articles, textbook chapters, and reports will be required. They will be posted on Moodle.

Moodle

The class Moodle page should be your first stop for information about readings, assignments, and what to expect in class. The page is color-coded: readings (blue) should be completed before class on the day of the entry, and assignments (orange) are due that day at the beginning of the class period. This will require some looking ahead on your part.

Piazza

You'll use Piazza to ask questions and post answers to your classmates about homework and class material. You can use this App on your computer or phone. The site embeds an equation editor, so you can use that for equations if you'd like, or you can upload a picture of your work (uploading pics of graphs is especially helpful). Louisa, Sarah, and Zak will monitor the App for your questions, but the key to making this work well is for you to answer your classmates' questions too. We'll be sure to check the answers you give and endorse them if they are correct or clarify them if necessary. Find our class page here.

Grading

Your final grade for this course will be determined by the number of points you accumulate throughout the semester.

Point distribution	
Reading Responses (10 @ 6 points each)	60
Homework (6 @ 60 points each)	360
Summative Report	
-Draft for Peer Review	20
-Final Report	160
TOTAL POSSIBLE	600

Reading Responses

We will require reading responses for 10 of 12 course readings (indicated on Moodle); you may skip two and still receive full credit. If you complete all 12, we will drop the lowest two scores from your grade. Responses will be graded on a zero to 6-point scale. Hand in each reading response on Moodle by **9:30am** the day for which the reading is assigned.

Homework
Experimentation with various approaches to assessing student learning suggests that take-home assignments and opportunities to re-do work generate the most learning, and in the most supportive way. For this reason, we have opted to encourage student learning via six substantial homework assignments, which together comprise 60% of the course points. We urge you to work together on your homework, but **each of you must use your own words to write up your own assignment, and you must write on your homework the names of those with whom you worked**. Especially because this course will not have exams, the homework will be challenging and comprehensive, so starting them early and working on a section each day is a good idea. Please upload your homework to Moodle as a pdf. You may write your problems out by hand, but your writing must be very neat and you must scan them to pdf before uploading. There are a number of free scan-to-pdf applications.

Homework will be graded and returned, after which time you will have one week to revise them and potentially receive up to 50% of the points you missed. This is totally optional, and you may choose to revise any or all of the questions where you didn't receive full credit.

Summative report
Being able to communicate complex information to a non-technical audience is an increasingly important skill. This assignment is designed to let you practice those skills by writing an evidence-based report about the effects of uncertainty in both scientific and economic tools for policymaking. See Moodle for a more specific description of the assignment. **Due 12/14 at 5:00pm Central Time.**

Class participation
In addition to regularly attending class and working actively with classmates, students will be occasionally responsible for leading class discussion or assuming a role in a debate. We also expect you to make positive contributions to the intellectual community of the course more regularly, which might include active participation in small group discussions, asking and/or answering questions in larger discussions, asking and/or answering questions on Piazza, listening to and responding respectfully to others' ideas, and coming to class fully prepared.

Note taking
Taking good notes is an incredibly useful life skill, and we strongly recommend that you take notes in this class. This looks somewhat different for almost everyone, but good notetaking almost always involves a few common practices. One is trying to capture the 'big picture' of what's being said rather than writing down every word. A second is rewriting your notes. Hear us out! If you rewrite your notes soon after the day's class, you'll see where the gaps in your notes/understanding are, and you'll be able to address them (by going to the textbook/reading, asking Sarah, Louisa, or Zak in office hours, or borrowing a classmate's notes) while the topic is still fresh in your mind. Lastly, we strongly suggest that you take notes in this class by hand (which could include on a tablet with a stylus). We will write and derive equations, and draw on the board *a lot*. And you're likely going to want to copy almost all of those drawings and equations! And that's hard for most folks to do on a laptop.

Some general words about deadlines
We strive to be compassionate and understanding about life's challenges while working within the constraints of a course whose material builds cumulatively over the semester. If you get sick, you should not come to class. Let us know via email and we will work with you to develop a plan of action. In general, while there are a number of occasions on which we may be more willing to be flexible with deadlines, in our experience it is usually better for students to hand in something incomplete but on time, rather than get behind on new material when striving for completeness or (gasp!) perfection. Allowing you to make corrections to homework further reinforces this philosophy.

Concern for Students' Overall Well-Being
We care first and foremost about your overall well-being. If you are struggling in this class or in life, please let us know. We can help you strategize about the course and can refer you to great people who can help you. This is a list of resources.

Academic integrity
Cheating on homework, including by using another's solutions, or any failure to acknowledge the contributions of others' work—including classmates—to your own are serious offenses. Cheating will result in a **grade of no-credit for the assignment and may result in a failing grade for the course**. It is your responsibility to become familiar with Macalester's policies on what constitutes these offenses and to behave accordingly. We will report all cheating and plagiarism to the Dean of Academic Programs. For more information, check here.

Disabilities
We are committed to providing assistance to help you be successful in this course. Accommodations are available for students with documented disabilities. Follow the links on this page to request or renew accommodations. Please do this early in the semester to ensure that necessary accommodations are approved so that you can begin the semester successfully.

Inclusivity
We are committed to providing a safe and equitable learning environment for students. We insist that we all treat each other with respect and act professionally, adhering to the American Economic Association code of conduct. We will respect all viewpoints and identities, and all levels of comfort with the material. We as learners and teachers all bring various experiences and life contexts to this course. These differences will emerge in class and be part of what we negotiate and benefit from as a developing community. We hope you will feel comfortable coming to us to express any concerns or suggestions; this is an iterative process that requires the collaboration of all.

Miscellany
If you have concerns about any aspect of this course, please come see one of us sooner rather than later. We will respond to Piazza and email during 'normal business hours.' While it is possible that we will check our email at 2am, we probably won't write you back until at least the next morning. So, don't wait until the last minute to email with that question about your assignment that's due tomorrow.

We are learning from each other in addition to conveying our expertise and learning with you. We will do our best to indicate which instructor to seek out for clarification or feedback about a particular topic.

Please turn off (all the way off, or Do Not Disturb on, not just to vibrate) your cell phone before coming to class.