

SYLLABUS  
ESM 229 – Economics and Policy of Climate Change  
Winter 2017

**Credits:** 4.0

**Time:** Monday/Wednesday, 8:30-9:45 am

**Location:** 1510 Bren Hall

**Professor:** Kyle Meng (kmeng@bren.ucsb.edu)

**Office Hour:** Wednesday 9:45-11am (4416 Bren Hall).

### **Course Description**

Anthropogenic climate change presents some of the biggest questions faced by modern society. Economics can provide a powerful intellectual foundation for understanding and analyzing many of these questions. This course covers the tools and insights from economic analysis that inform upon our understanding of climate change impacts, the design of mitigation and adaptation policies, and the implementation of these policies. The course is centered on key conceptual ideas from environmental and natural resource economics but will also draw from other fields in economics as they pertain to climate change. The quarter is broken into two sections. During the first half of the course, students will develop mastery of economic concepts relevant for climate change and acquire tools, both theoretical and empirical, for conducting economic analyses of climate impacts and policies. The second half of the course will hone students' ability in applying these insights and tools through policy debates and a final paper and presentation. The goal is to help students become informed and critically-minded practitioners of climate policy.

### **Prerequisites and Workload**

Introductory microeconomics (ESM 251), environmental economics (ESM 204), and statistics (ESM 206) are required. Typically, this course is recommended only for 2<sup>nd</sup> year MESM students or 1<sup>st</sup> year MESM students with comparable prior coursework. Familiarity with statistics and modeling in R is preferred and will be developed throughout the course.

Expect about 5-6 hours of work per week. Preparation for each class will entail 2-3 reading assignments (~40 pages total) throughout the quarter. The first part of the course, lasting 7 weeks, will be on learning fundamental concepts related to the economics of climate change as well as acquiring analytical tools in numerical modeling and statistics to tackle related problems. In addition to regular readings, this part of the course will contain 4 problem sets, each set apart by roughly 1 week, and an in-class midterm exam.

The second part of the course focuses on applying and honing the critical and analytical skills acquired from the first part. Remaining classes will be dedicated to Senate panel style debates in which I assign controversial prompts to randomly assigned opposing teams of students who must defend their position using economic concepts, reasoning, and evidence from the first part of the course. These debates will also help students uncover open questions that they can tackle for the final paper (~10 pages) and presentation.

### **Readings**

Most readings will be academic journals. There is one required book for this course:

Keohane and Olmstead, (2016). *Markets and the Environment*. Island Press.

## Grading

- 1) Problem sets (4x5): 20%
- 2) Midterm: 40%
- 3) Case study debate: 10%
- 4) Research paper: 20%
- 5) Attendance: 10%

## Class Schedule

### I. Intro and big-picture

**Date:** 1/9

**Readings:**

- Keohane and Olmstead, Chapters 1-3.
- Fullerton and Stavins, “How Economists See the Environment,” *Nature*, 1998.

### II. Optimal climate policy

**Dates:** 1/11, 1/18, 1/23

**Concepts:** economic efficiency, carbon abatement costs, social cost of carbon, discounting

**Tool:** integrated assessment model, numerical modeling in R.

**Readings:**

- Stern, Nicholas (2008), “The Economics of Climate Change”, *American Economic Review: Papers & Proceedings*, 98(2), 1-37. Read up to Section 3.
- Nordhaus, W. (2013). Chapter 16 - Integrated Economic and Climate Modeling. *Handbook of Computable General Equilibrium Modeling*. B. D. Peter and W. J. Dale, Elsevier. Volume 1: 1069-1131. Read up to Section 16.1.10.
- Ackerman, F., S.J. DeCanio, R.B. Howarth, and K. Sheeran. 2009. “Limitations of integrated assessment models of climate change.” *Climatic Change*.
- Hepburn, Cameron (2006), “Discounting climate change damages: Working note for the Stern review”.
- Weitzman M. Some Basic Economics of Climate Change. In: Touffut J-P *Changing Climate, Changing Economy*. Edward Elgar; 2009
- Millner, Antony, and Heal, Geoffrey, “Uncertainty and decision making in climate change economics”, *Review of Environmental Economics and Policy*, Vol. 8 (1), pp 120:137, 2014.

**Problem Sets:**

1. Introduction to an Integrated Assessment Model of Climate Policy (due 1/23).
2. Optimal climate policy with an IAM (due 1/30).

### III. The economic impacts of climate change

**Dates:** 1/25, 1/30

**Concepts:** adaptation

**Tool:** empirical estimation of climate damages, statistical models in R.

**Readings:**

- Dell M, Jones B, Olken B. What Do We Learn from the Weather? The New Climate-Economy Literature. *Journal of Economic Literature*. 2014. Sec. 2.1 and 4.1
- Pindyck, R.S. (2013). “Climate Change Policy: What Do the Models Tell Us?” *Journal of Economic Literature* 51(3): 860-872.

- America's Climate Prospectus, Chapters 5, 12, and 13.

**Problem Set:**

3. Estimating climate damages (due 2/6).

**IV. National climate policy**

**Dates:** 2/1, 2/6, 2/8, 2/13 (emissions trading simulation)

**Concepts:** externalities, cost effectiveness, carbon tax, cap-and-trade

**Readings:**

- Keohane and Olmstead, Chapters 5, 8, 9.
- Goulder and Parry, "Instrument Choice in Environmental Policy." *Review of Environmental Economics and Policy* 2008.)
- Aldy, Krupnick, Newell, Parry, and Pizer, "Designing Climate Mitigation Policy." *Journal of Economic Literature*, 2010) Section 3.
- Goulder "Markets for Pollution Allowances: What Are the (New) Lessons?" *Journal of Economic Perspectives* 27(1), Winter 2013.
- ARE, Special Issue: California's Climate Change Policy: The Economic and Environmental Impacts of AB 32—Notes from the Editors, 2010, up to page 15.

**Problem Set:**

4. Emissions trading simulation (due 2/13)

**V. Innovation**

**Date:** 2/15

**Concepts:** knowledge spillovers, induced innovation, directed technical change

**VI. International climate policy**

**Dates:** 2/22, 2/27

**Concepts:** game theory, prisoner's dilemma, free-riding

**Readings:**

- Barrett, Scott (2008) "Climate treaties and the imperative of enforcement", Oxford Review of Economic Policy.
- Bodansky et al. (2015). "Facilitating linkage of climate policies through the Paris outcome" Climate Policy.

**VII. Midterm review and test**

**Dates:** 3/1 (review), 3/6 (test)

**VII. Policy debates**

**Dates:** 3/8, 3/13, 3/15

## **UCSB academic policies**

Honesty and integrity in all academic work is essential for a valuable educational experience. The Office of Judicial Affairs has policies, tips, and resources for proper citation use, recognizing actions considered to be cheating or other forms of academic theft, and students' responsibilities, available on their website at: <http://judicialaffairs.sa.ucsb.edu>. Students are responsible for educating themselves on the policies and to abide by them.

Furthermore, for general academic support, students are encouraged to visit Campus Learning Assistance Services (CLAS) early and often. CLAS offers instructional groups, drop-in tutoring, writing and ESL services, skills workshops and one-on-one consultations. CLAS is located on the third floor of the Student Resource Building, or visit <http://clas.sa.ucsb.edu>

## **UCSB academic support**

### **Disabled Students Program: accommodations for exams**

Students with disabilities may request academic accommodations for exams online through the UCSB Disabled Students Program at <http://dsp.sa.ucsb.edu/>. Please make your requests for exam accommodations through the online system as early in the quarter as possible to ensure proper arrangement.

### **Managing stress / Supporting Distressed Students**

Personal concerns such as stress, anxiety, relationships, depression, cultural differences, can interfere with the ability of students to succeed and thrive. For helpful resources, please contact UCSB Counseling & Psychological Services (CAPS) at [805-893-4411](tel:805-893-4411) or visit <http://counseling.sa.ucsb.edu/>.