

ENVI 194: Global Climate Change
Fall 2008

Instructor: Dr. Greg Downing
Office: 313 Olin-Rice
Phone: 6286

Class Hours: 3 – 4:30 Tues/Thurs, Olin-Rice 101
Lab Hours: 8 – 11 Thurs, Olin-Rice 187

Office Hours: 10:00 – 11:00 Tues
1:30 – 2:30 Thursday

Textbook: The Earth System (2nd Edition), by Kump, Kasting, and Crane.

Grading:

20% Midterm 1
20% Midterm 2
30% Final
20% Lab
10% Class Participation

Global Climate Change will be broken down into roughly three sections: 1) the fundamental physics and chemistry of the modern climate system; 2) evidence of climate variability of the past (“paleoclimate”); and 3) the anthropogenic influence on current and future climate. In addition, we will spend the last few class periods discussing climate change adaptation and mitigation. This course is fundamentally a science course, and as such will be highly quantitative at times. This will be evident in lab and exam material. However, climate change is very much a social, political and economic issue as well, and we will address these aspects of climate change throughout the semester.

Class periods will consist of lecture, discussion and group exercises. The class participation portion of the grade will be based on active participation in discussions and group work.

Labs will consist largely of working with climate datasets and models, as well as a few hands-on experiments. There will be problem sets for each of the labs based on the material covered in the lab. These will be due at the beginning of the next lab (i.e., one week later). Problem set grades will be deducted 20% for each day they are late.

Readings are primarily from the Kump et al. text. Additional readings will be assigned as the semester progresses. We will attempt to read articles from the primary literature as much as possible – I will post these on Moodle. In addition, you should try to keep up to date on climate change in the news. A few good places to check regularly are Andy Revkin’s Dot Earth blog at dotearth.blogs.nytimes.com and the Real Climate blog at www.realclimate.org. We will attempt to include current events in our class discussions, and it is your responsibility to stay informed.

Exams will be a combination of short answers and somewhat longer essay type questions. Material from lectures, class discussions, labs and the readings will be covered in the exams. The final must be taken during the scheduled exam time, which is Wednesday December 10th from 1:30 – 3:30 p.m.

Schedule (Subject to Change)

Day	Date	Topic	Lab	Readings
Th	8/28	Introduction	No Lab.	Ch. 1; Ch. 2 (pp18-23)
T	9/2	Radiation budget		Ch. 3 (pp 34-41)
Th	9/4	Greenhouse effect	Radiation and the Greenhouse Effect	Ch. 3 (pp 41-48)
T	9/9	Atmospheric convection		Ch. 3 (pp 48-53)
Th	9/11	Moisture and clouds	Cloud Forcing	
T	9/16	Atmospheric balance, weather		Ch. 4 (pp 55-68)
Th	9/18	General circulation, climate zones	Atmospheric Forces, Balances, and Weather Systems	Ch. 4 (pp 68-82)
T	9/23	Ocean circulation		Ch. 5
Th	9/25	Ocean stratification	Ocean Circulation Simulation	Ch. 5
T	9/30	Midterm		
Th	10/2	Ocean/ Atmosphere coupling	TBD	
T	10/7	ENSO- Ocean/ Atmosphere coupling		Ch. 15 (306-312)
Th	10/9	ENSO- impacts	ENSO Impacts	
T	10/14	The cryosphere	(Switch w/Thurs) The Cryosphere	
Th	10/16	Fall Break, no class		
T	10/21	Earth's carbon cycle		Ch. 8
Th	10/23	Proxies and archives	Modern Atmospheric CO ₂	Ch. 14
T	10/28	Paleoclimate		Ch. 10; Ch. 11; Ch. 12
Th	10/30	Paleoclimate	Abrupt Climate Change	Ch. 15 (289-306)
T	11/4	Midterm		
Th	11/6	Anthropogenic influence on climate	ED GCM	Ch. 16
T	11/11	Introduction to climate models		Ch. 6
Th	11/13	General Circulation Models	ED GCM	Ch. 6
T	11/18	Future climate projections- Intergovernmental Panel on Climate Change (IPCC)		IPCC Fourth Assessment Report (AR4)
Th	11/20	IPCC	TBD	IPCC AR4
T	11/25	Impacts of climate change		IPCC AR4
Th	11/27	Thanksgiving, No class		
T	12/2	GHG/CC Remediation		IPCC AR4
Th	12/4	GHG/CC Remediation	Carbon Footprints	IPCC AR4