Climate Dynamics - Geography (GEOG) 142 [4 units]

Fall 2014

Instructor: Prof John Chiang, 547 McCone, jch_chiang@berkeley.edu
Office hours: TBA
Class Time and Location: TTh 9:30-11a, 575 McCone

Readers:
Jesse Day (jessed@berkeley.edu)
Octavia Crompton (octavia@berkeley.edu)

Course home page: on bCourses, http://bcourses.berkeley.edu
Lecture slides: if available, will be posted on bCourses the night before the lecture. It'll usually be late at night, so best that you check in the morning prior to coming to class.

Goal and Philosophy:
The course presents a ***conceptual*** basis for understanding of the workings of the global climate system, and how they conspire to bring about change. The goal is to give the student a climate dynamics basis for understanding global climate change.

A detailed understanding climate dynamics is becoming increasingly necessary as part of an Environmental Science education. My goal with this course is to teach climate dynamics as rigorously as possible, but also recognizing the fact that the audience for such a course is now drawn from a far wider range of interests, and not necessarily from those with a traditional physics and mathematics background.

Prerequisites:
Concepts in physics are used in the text, so knowledge at the level of first course in undergraduate physics is highly recommended. Basic calculus will be very helpful, though not assumed. On the first day of class, I will hand out a questionnaire to gauge your background in physics and mathematics. ***Please read the separate note on prerequisites.*** If you are uncertain about your preparation, please contact me.

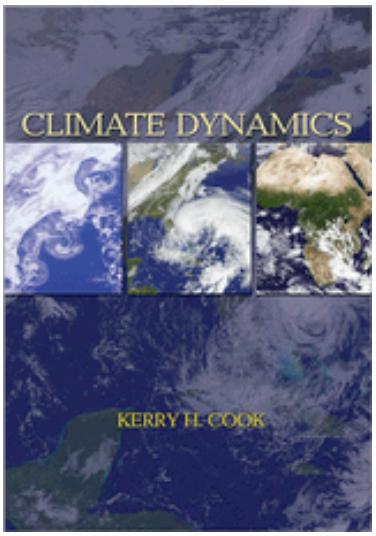
Course requirements (grade weightings are approximate, subject to change)
Homework sets and write-ins (30-35%)
Midterm (25-30%) – date TBA, but likely to be in-class on Tue Oct 21.
Final exam (40%)
Taking the midterm and final exams are required in order to pass the course

Expectations - I expect you to

- Maintain academic integrity at all times
- to attend all lectures
- to participate in the class discussions
- ask questions!

Required Text:

'Climate Dynamics' by Kerry H Cook, Princeton University Press (2013). Available at ASUC bookstore.



Helpful: **(**available in Earth Sci & Map Library):
Climate Change and Climate Modeling (JD Neelin, Cambridge Press (2011)).
Global Physical Climatology (Dennis Hartmann, Academic Press (1994)).
Open University Course Team Staff: "Ocean circulation"
Atmospheric Science: An Introductory Survey, 2nd Edition. (Wallace, J. M. and P.V. Hobbs Academic Press (2006)).

Outline of course (subject to change):

I'm in the process of redesigning this course, and am using a new textbook, so the outline is in a bit of flux and different from previous offerings. The preliminary list of topics to be covered is below (but subject to change). We will also do a trip to view the "Science on a Sphere" demonstration at the Lawrence Hall of Science.

- Observations of the climate system and simple physical concepts (3 lectures)
- Energy balances and radiative processes (5 lectures)
- Dynamics and atmospheric circulations (3 lectures)
- Ocean circulation and cryosphere (3 lectures)
- Natual climate variations, hurricanes, and El Nino (3 lectures)
- Radiative forcing and climate sensitivity (2 lectures)
- Climate models (1 lecture)
- Global warming (3 lectures)

Please note that while I do cover the physics of climate change, *I do not cover societal impacts of climate change nor climate change policy* – the focus of this course is on the physics of climate. If you are interested in impacts and policy, I will be teaching (w/ human geographer Nathan Sayre) L&S70B Global Warming in Spring 2015.

Academic Code of Conduct

"As a member of the UC Berkeley community, I act with honesty, integrity, and respect for others"