1-2013

GEO 482.01A: Global change

Johnnie N. Moore
University of Montana - Missoula, johnnie.moore@umontana.edu

Geology 482 - Global Change, Spring 2013

Instructor: Professor J. N. Moore (johnnie.moore@umontana.edu)

Goals

1) Learn the theoretical and analytical foundations of the processes affecting Earth's landscape and climate, emphasizing energy balance, energy distribution processes and controls at the planetary scale over different time scales (historical to geologic). 2) Develop the tools to analyze climate data over a range of temporal and spatial scales, from regional historical data to global geologic data. 3) Develop an understanding of the primary literature of global change and be able to write and orally present this information.

This class will be challenging and require an extensive amount of work outside of class (6-8 hours/week). It will be extremely difficult for you to catch up if you get behind, because later material will build on earlier material. So, if you have problems see me immediately.

Climate science is grounded in geology, physics, math, and chemistry (and to a lesser extent, biology), so this course will require a solid background in those disciplines. Upper division standing in Geosciences, or many other natural science disciplines, should be ample preparation. If you have no science preparation, this course will not be accessible to you. An introductory climate science course, such as our GEO 108 course, will also be very useful--I will expect that level of climate science knowledge along with the allied science and geoscience fundamentals.

Grading and Exams

There will be at least two exams during the term, a midterm (100 pts) and a comprehensive final exam (200 pts). There will be no makeup exams except for documented medical or family emergencies. There will be class and homework assignments (150 pts) and a term paper (100 pts) with an in-class presentation (25 pts). I may modify this distribution as needed; the above is just a guide. Your final grade will be earned based on the following distribution: >90%, A; 80-89%, B; 65-79%, C; 50-64% D; and, <50%, F. There is no extra credit or additions work to modify grades you receive.

All homework assignments are due the following class meeting at the beginning of the class, or when designated. **I will not accept late homework**. You should be ready to discuss and present your answers to the class if called upon. You can miss one homework assignment without penalty, but more than one will be counted as zero. Be organized, neat and complete on all assignments. You must type, plot and print out all assignments. I expect professional presentation, accuracy, and correct grammar. No hand written, hand plotted or other hand drawn materials will be accepted unless I expressly say it will be acceptable.

We will communicate when not in class via your **UM email**. UM rules do ot allow me to communicate through off-campus email accounts. I will upload all assignments to *Moodle* or give them out in class. Please check the GEO 482 *Moodle* space often for important announcements and information.

Textbook: *Paleoclimates: Understanding climate change past and present, T. M. Cronin,*

2010. The textbook will act as a reference for the topics we will cover but we will need much more information that I will give you in lectures and other readings. I expect you to know and be able to use all material given in class and in all readings. I will not give out lecture notes, so you will need to take detailed notes in class and combine those with readings to have a complete understanding of the material. There will be no practice exams, no study guides, and no review sessions for exams. I expect you to do all the preparation on your own and have a complete command of all information covered. If you have questions make sure to see me well before exams. This is a rigorous course and requires hard work.

Preliminary Schedule

Week	Topic	Reading
Jan 29	Intro. exercises, background ques., Introduction, Earth's energy balance, energy basic balance models.	Chap 1 & 2, Fig 1.2; readings; Take Notes
Feb 5	Planetary Energy Balance cont'd, latitudinal controls; Faint Young Sun Problem and "solutions". Term Paper Topics Due Thursday	Take notes; Pages57-64; readings
Feb 12	Greenhouse effect process details; emissivity and other climate feedbacks; climate sensitivity; Ex. 6 & 7	Take notes; readings as needed.
Feb 19	Exploring energy balance and the Snowball and Slushball Earth concepts/evidence/controls.	Take notes; Pages 59-64; readings
Feb 26	Rock cycle and geologic carbon cycle;	Take notes; Readings.
Mar 5	Paleozoic and Mesozoic paleoclimate data and processes; paper topic presentation on Thur.	Take notes; Pages 64-79; readings.
Mar 12	Cenozoic paleoclimate data and processes; ocean processes at different scales.	Take notes; Chap. 4 & 5; readings
Mar 19	MIDTERM EXAM on Tuesday of this week; Pleistocene paleoclimate; internal and external forcings and feedbacks	Take notes; Chap. 5, 6 & 7; readings.
Mar 26	Holocene paleoclimate; forcings and feedbacks	Take notes; Chap. 8 & 9; readings.
Apr 2	SPRING BREAK: NO CLASSES	Take notes;
Apr 9	Historical climate trends and processes.	Take notes; Chap. 10, 11 & 12; readings.
Apr 16	Historical climate cont'd; Future climate trends and processes.	Take notes; Readings
Apr 23	Future climate trends and controls.	Take notes; Readings.
Apr30	Term Paper discussion/presentations (start depends on number of presentations).	
May 7	Term paper presentations. TERM PAPERS DUE.	
May 13	Final Exam: Wednesday, May 15, 1:10-3:10PM	

* This schedule is preliminary and will likely change during the semester depending on our progress.