

GEO 302C – Climate: Past, Present, Future (Spring 2014)

Location: CLA 0.126

Time: MWF 9:00-10:00

Professor: Tim Shanahan

Office: Schoch 3.126 (Shanahan)

Office hours: Monday 3:30-5:00 (Shanahan)

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Textbooks

Earth's Climate: Past and Future (2nd edition) W.F. Ruddiman, W.H. Freeman and Company, ©2008 ISBN-13: 978-0-7167-8490-6 ISBN-10: 0-7167-8490-4

BlackBoard Use

PowerPoint lectures and lab handouts are available on BlackBoard. It is expected that you have a computer with internet access or that you have access to these facilities.

Overview:

This is an introductory-level course intended for non-science majors. Lecture times are MWF 9-10am, room 0.126 in the Liberal Arts Building, plus one 1.5-hour discussion section in room 2.308 Geology Building.

Course content:

Climate history of the Earth and the reasons behind Earth's climate change, including the physical concepts and climate processes that control heat and mass transfers in the atmosphere; the role of oceans; scales of climate change including tectonic-scale, orbital-scale, glacial and millennial-scale, historical and future climate change; global warming; human effects on climate; health impacts of climate change; ecosystem impacts

Course Credit:

This course may be used to fulfill three hours of the natural science and technology (Part I or Part II) component of the common core curriculum and addresses the following four core objectives established by the Texas Higher Education Coordinating Board: communication skills, critical thinking skills, teamwork, and empirical and quantitative skills.

Policy on Grades:

Final Grades: Your final letter grade will be based on your total score from exams and labs. Grades are assigned using a standard curve that reflects the accomplishment of the class as a whole. The percentage-letter grade relationship will usually be: **>90 A, 80-89 B, 70-79 C, 60-69 D, and < 60 F**. Your attendance will affect your final grades.

Exam (55%): three midterms and one final exam will be given. All three midterm exams and the final exam must be taken. Your best two midterm scores **plus** the final exam score will be counted as 55% of your final grade - i.e., you may drop you one lowest midterm score, but not the final exam score. The [Exam Schedule](#) is on the web. Exams are given only once. There are **NO** make-up exams, **NO** extra-credit in lectures and labs, and **NO** specially scheduled exams. Exceptions may be made for students with disabilities, but they must request any special arrangements early in the semester. All exams are cumulative in their coverage. They will cover material from lectures and reading assignments. You will be asked questions about general concepts as well as specific points of information.

YOU MUST BRING YOUR UT ID CARDS TO ALL EXAMS. ALL NECESSARY MATERIALS EXCEPT PENCILS AND ERASERS WILL BE PROVIDED.

Lab Assignments (30%): Lab assignments must be turned in on time, at the beginning of your assigned lab section. Lab assignments turned in late will receive 0 credit. Your cumulative score from lab assignments will be counted as 30% of your final grade.

Attendance and participation (15%): We will be using the clicker in class as a mechanism for stimulating participation. You are required to bring your clicker to class every day and your participation in class will be logged using the response from your registered clicker.

Attendance: Your success in this course depends on your class and lab attendance. Excessive absences **will** work against you, while perfect attendance can help you to the next highest letter grade in borderline situations at the end of the semester. We typically find that students who rely only on class notes, without attendance, perform poorly on exams and in the class in general.

Statute of Limitations: If you wish to appeal a grade received on an exam, or lab, your appeal must be made within 7 days from the time it is handed back. No appeals will be considered after that deadline.

The University Honor Code: “The core values of The University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the University is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community.”

Students are expected to read and to strictly adhere to the University’s written policies on academic dishonesty. Cheating or plagiarism will result in a zero for the semester.

A note to students with disabilities: students with disabilities may request appropriate academic accommodations from the Division of Diversity and Community Engagement, Services for Students with Disabilities, 471-6259.

Class	Topic	Text reading	Additional reading	Lab
1	01-Introduction	NA	Class syllabus	no lab
2	02-Weather vs Climate	Ch. 1, p. 1-16		
	<i>No class meeting</i>			
	<i>Holiday</i>			no lab
3	03-Climate Variability		Supp. chapter 1	
4	04-Energy Balance I		Supp. Chap. 2; pp. 1-5	
5	05-Energy Balance II		Supp. Chap. 2; pp. 1-5	Lab 1-Intro + weather v climate
6	06-Atmosphere I		Supp. Chap. 2; pp. 15-22	
7	07-Atmosphere II		Supp. Chap. 2; pp. 15-22	
8	08-Hydrological Cycle		Supp. Chap. 2; pp. 10, 16-17, 21, 31-32, 34	Lab 2 DaisyWorld
9	09-Atmo Circulation		Supp. Chap. 2; pp. 15-22	
10	10-Ocean Circulation		Supp. Chap. 2; pp. 22-24	
11	10a-Ocean Circulation II		Supp. Chap. 2; pp. 24-27	Lab 3 Energy Budget
12	11- Air Sea interactions	Ch 16 p. 299-302; Ch 17 p. 321-324	Supp. Chap. 2; pp. 22-27	
13	11a-Hurricanes		Supp. Chap. 2; pp. 22-27	
	EXAM REVIEW			Lab 4 Greenhouse gases
14	EXAM 1			
15	12-Cryosphere	Ch 2 p. 21; C10 p. 176-177	Supp. Chap. 2; pp. 8, 27-30	
16	13-Biogeochem	Ch 3 p. 46-47; p. 53-58	Supp. Chap. 2; pp. 30-35	Lab 5-air sea interactions
17	14-Paleoclimate Proxies			
18	15- Stable isotopes	Appendix I: p. 360-361; Ch. 6.2, p. 100-101		
19	16-Radiocarbon			Lab 6 Productivity
20	17-High resolution records			

21	18-Tectonics and climate <i>spring break</i> <i>spring break</i> <i>spring break</i>	Ch. 4, 64-67, 71-80, Ch. 5, p. 81-86;	no lab
22	19-Orbital climate	Part III, p. 116-117; Chapter 7 (p. 119-136) and Chapter 8 (137-153)	Lab 7-tree rings
23	20-Ice sheets	Chapter 9 (p. 163-174, Ch. 12 (p 210-228)	
24	21-ice cores	Chapter 10 (p. 175-190); Appendix II: p363-364	
25	22-Pleistocene ice ages	Chapter 11 (p. 191-205)	Lab 8-marine sediments
26	23-Last Glacial Maximum	Part IV, p. 205-206; Chapter 12 (p. 209-224)	
27	EXAM REVIEW		
28	EXAM 2		Lab 9 - thermohaline
29	24-Deglaciation		
30	25-Millennial variability		
31	25a-Holocene		Lab 10-modern CO2
32	26-Historical climate	Part V, p. 270-271; Chapter 16 (p. 287-308)	
33	27-Volcanoes and sunspots	Chapter 16 (p. 303-306)	
34	28-Instrumental climate	Chapter 17 (p. 309-324)	Lab 11 - Weather
35	29-Culture and climate		
36	30-Climate and health	Chapter 18 (p. 325-335)	
37	31-Greenhouse gases	Chapter 18 (p. 325-335)	Lab 12 - prep for presentation
38	32-Greenhouse debate	Chapter 18 (p. 325-335)	
39	TBD		
40	TBD		Final presentations

41 EXAM REVIEW

42 **EXAM 3**