

SYLLABUS Fall 2014**Physical Basis of Global Warming SIO 117**

Instructor: Ralph Keeling (rkeelingucsd.edu, 534-7582)

Lecture:

MWF 3:00-3:50 p.m. HSS 1305

Discussion (not every week, TBD):

Wed. 4:00-4:50 HSS 1305

Course Prerequisites: Math 20D and Phys. 2C or consent of instructor

Relevant Texts:

David Archer, *Global Warming, Understanding the Forecast*, Blackwell, 2007 - Available online through UCSD LibraryDavid Neelin, *Climate Change and Climate Modeling*, Cambridge University Press 2011- Available line through UCSD Library

Course material downloads, including lecture notes and problem sets: ted.ucsd.edu

Problem Sets will be given out roughly weekly, typically due on Friday.

Grading: Problem Sets 25%, Midterm 25%, Final 50%

		Reading
Oct 3	1. Introduction	(Neelin, 1.1-1.4,1.6)
Oct 6	2. Elements of climate system	Archer 1, Neelin 2.1, 2.4, 2.5.1, 2.6
Oct 8	3. Planetary energy balance	Archer 2, 3 (Neelin 2.2-2.3)
Oct 10	3. - continued	
Oct 13	4. Molecular Structure, IR spectra	Archer 4
Oct 15	5. Radiative transfer	
Oct 17	6. Vertical energy transport	Archer 5 (Neelin, 2.3)
Oct 20	7. Vertical structure, hydrostatic balance, etc.	Archer 5 (Neelin 3.1, 3.2, 3.3)
Oct 22	8. Convection and moist effects	Archer 5 (Neelin, 3.5, 3.6, 5.3.2, 5.3.3)
Oct 24	8. - continued	
Oct 27	9. Physical processes 1	Archer 6, Neelin 3.1, 3.2, 3.3, 3.4.4
Oct 29	10. Physical processes 2	
Oct 31	10. - continued	
Nov 3	11. Climate models	Neelin 5.1, 5.4-5.6
Nov 5	11. continued	
Nov 7	12. Refinements to layer model	Neelin 6.1-6.2
Nov 10	MIDTERM	
Nov 12	12. - continued	
Nov 14	13. Climate sensitivity and radiative forcing	Neelin 6.1-6.2
Nov 17	14. Climate feedbacks	Archer 7, Neelin 6.3-6.7
Nov 19	14. - continued	
Nov 21	15. Transient climate response	Neelin 6.8
Nov 24	15. - continued	
Nov 26	16. Greenhouse gas controls	Archer 8
Nov 27	THANKSGIVING HOLIDAY	
Dec 1	16 - Greenhouse gas controls - continued	
Dec 3	17. The carbon cycle and CO ₂	Archer 9, 10 (Neelin 2.8)
Dec 5	18. Observed climate changes	Archer 11 (Neelin 7.6)
Dec 8	18. - Continued	
Dec 10	19. Model projections and consequences	Archer 12 (Neelin 7.7)
Dec 12	19. -continued	
Dec 19	FINAL EXAM 3:00-5:59 pm Location TBA	