University of Oklahoma
College of Atmospheric and Geographic Sciences: School of Meteorology

METR 5503: Climate Dynamics

Spring 2016

Instructor: Dr. Elinor Martin
Office: NWC 5642
Email: elinor.martin@ou.edu [I will make every effort to respond to emails within 24 hours (or 48 hours at the weekend)]
Phone: (405) 325-7392
Office Hours: MW 11.30am-1.00pm or by appointment
Course Website: D2L & http://weather.ou.edu/~ermartin/METR5503.html

Course Meeting Time and Location: 2:00 - 2:50pm MWF NWC 5930
Course Prerequisite: METR5113, or permission of instructor

Course Description:

The importance of climate is indisputable; if the climate were not approximately what it is today, Earth and the weather on it would be very different. This course provides an introduction to climate and the field of climate dynamics. During the course we will examine the processes that determine the climate and contribute to its change, including global and surface energy budgets, atmosphere and ocean circulations, climate feedbacks and interactions between components of the Earth system. In addition, students will learn about climate models used to examine past, present and future climate.

Course Goals:

The overall goal of this course is for the student to gain a broad process-level understanding of the Earth's climate system.

Learning Outcomes:

At the end of this course, students will be able to:

1) Evaluate the global and surface energy balance of the Earth, including heat, momentum and water budgets using sketches, equations and qualitative descriptions.
2) Examine the roles of the atmosphere, ocean and land in the climate system.
3) Identify types of climate models and experiments and summarize the advantages and disadvantages of each.
4) Synthesize knowledge of the climate system to critically evaluate scientific literature.
5) Construct, produce, write, rewrite and evaluate a research project concerning the climate system.

Texts and Materials:
No required text, but the following books are useful for reference. Additional material will be available on the website.

** Global Physical Climatology: Hartmann*
** Atmospheric Science: An Introductory Survey: Wallace and Hobbs*
** Atmosphere,Ocean, and Climate Dynamics, An Introductory Text: Marshall and Plumb*
** Physics of Climate: Peixoto and Oort*
** Climate Dynamics: Kerry Cook*

Final Grade:
The final letter grading for the course will be as follows: A ≥ 90%, B = 89-80%, C = 79-70%, D = 69-60%, F = <60%. I will round all averages to two significant figures (69.5 will round to 70 and 69.4 will round to 69) to determine the final grade. I reserve the right to adjust the boundaries downwards (e.g. over 90 % will always be guaranteed an A) linearly or with a curve. The course grade will be determined by:

Class Participation	15%
Homework	35%
Term Project	50%

Learning Activities and Assessment:
Class Participation:
Class discussion, problems, and student-led reviews and literature discussions are an important part of this class and you are expected to participate. Once a week, a student will lead a review (3-4 bullet points) of the important concepts from the previous week. I will compile these points and they will be available on the website.

Homeworks:
Homework will cover material discussed in class. The homework will be a combination of quantitative problems, qualitative descriptions, data analysis, and critical evaluations of current literature.

Term Project:
For the term project the students will undertake a research project concerning a topic of their interest within climate dynamics. The culmination of this project will be the writing of an "expedited contribution" AMS manuscript and submitting it to me, the "Editor". I will then assign each student a manuscript to review. When you receive your reviews you will revise your manuscript taking into consideration the reviewers comments and resubmit it to the editor including responses to the reviewer as you would for a real journal publication. The final component is an oral

presentation on the project. Additional guidelines regarding the term project and grading rubrics will be distributed separately and available on the website. The term project grade will be evaluated as follows:

Term Project Components	Percentage Points
Initial Proposal	3
Final Paper	25
Response to Reveiwer	4
Review of Student Paper	6
Oral Presentation	12
Total	**50**

Course Policies

Make-up Policy

If a student misses an assignment through a university excused absence I will provide an opportunity for a make-up assignment.

Absences

Attending every lecture is highly recommended and expected. Not attending class will impact your grade through a lack of class participation.

Late Assignments

Assignments are due on the date indicated. Late assignments will not be accepted after one week late without prior approval of the instructor. Non-approved late work is subject to a 5% reduction of the grade per day the work is late.

University Policies

Academic Integrity

All students are expected to conform to college-level standards of ethics, academic integrity, and academic honesty. By enrolling in this course, you agree to be bound by the Academic Misconduct Code published in The University of Oklahoma Student Code (www.ou.edu/studentcode/OUStudentCode.pdf). For further clarification please see: www.ou.edu/provost/integrity-rights/.

Religious Observance

It is the policy of the University to excuse the absences of students that result from religious observances and to reschedule examinations and additional required classwork that may fall on religious holidays, without penalty.

Reasonable Accommodation Policy

Students requiring academic accommodation should contact the Disability Resource Center for assistance at (405) 325-3852 or TDD: (405) 325-4173. For more information please see the Disability Resource Center website http://www.ou.edu/drc/home.html. Any student in this course who has a disability that may prevent them from fully demonstrating their abilities should contact me personally as soon as possible so we can discuss accommodations necessary to ensure full participation and facilitate your educational opportunities.

Tentative Schedule (subject to change):

Dates	Topics	Deadlines	Notes
Week 1: 1/18	Introduction: The Earth System		No class 18/1
Week 2: 1/25	Statistics for Climate Review	HW1 1/25	
Week 3: 2/1	Radiation, Energy and Climate	Project Proposal 5/2	
Week 4: 2/8	The Land Surface	HW2 2/12	
Week 5: 2/15	Atmospheric Circulation		
Week 6: 2/22	Atmospheric Circulation		
Week 7: 2/29	The Oceans & Climate	HW3 3/4	
Week 8: 3/7	The Oceans & Climate		
SPRING BREAK			
Week 9: 3/21	Climate Variability	HW4 Due 3/21	
Week 10: 3/28	Climate Modeling	Initial Paper 4/1	
Week 11: 4/4	Climate Modeling		
Week 12: 4/11	Climate Sensitivity & Feedbacks	Reviews Due 4/15	
Week 13: 4/18	No Class (AMS Tropical Conference)		
Week 14: 4/25	Climate Change		
Week 15: 5/2	Final Presentations		Pre-Finals Week
May 9th 2016	Final Exam Period	Final Revised Paper & Responses to Reviews	Finals Week