ATS 606 Introduction to Climate- Spring 2016

**Instructor:** Professor Eric Maloney  
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Maloney’s Office Hours: Any time

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**Web:** Class webpage is available on Canvas. Please let me know if you have trouble. Discussion papers will be posted on this site.

**Class Schedule:** Class meets in ATS 101 at 10 a.m.-10:50 a.m. MWF.

**Maloney Office Hours:** Any time  
**Peters’s Office Hours:** Tuesday, 3 p.m.-5 p.m.; Friday, 2 p.m.- 4 p.m.; or by appt.

**Contact hours:** 3 (At least 2 hours of effort are expected to complete and homework and computing assignments outside of class for each hour of class time.)

**Student Learning Goals and Objectives:** The successful student will gain a broad graduate level process-oriented understanding of the Earth’s climate system. The material will provide a strong foundation for further specialized study on the climate system that provides contributions to the peer-reviewed scientific literature.

**Text:** No textbook will be required, and I will largely use my own notes for the course, which will be posted on Canvas. Two good references are: 1) *Global Physical Climatology*, by D.L. Hartmann, Academic Press, 1994, 411pp. (a second version of this text also exists, which might be even better!) and 2) *Atmospheric Science: An Introductory Survey*, by J. M. Wallace and P. V. Hobbs, Second Edition, Academic Press, 483pp. 3) *Atmosphere, Ocean, and Climate Dynamics, An Introductory Text*, by John Marshall and Alan Plumb, 319 pp. Homework problems will be assigned from these texts.

The format of the class will be lecture/discussion. I intend to follow the outline included here, which is inspired by the outline in Hartmann. We will also address current themes or problems in climate research and spend time reading papers from the recent scientific literature and discussing them in class, especially near the end of the course.
**Grading:** The course requirements and grading will be approximately as follows:

*Homework:* 40%  
*First Exam:* (Week 6 [tentative]) 25%  
*Second Exam:* (Week 12 [tentative]) 25%  
*Class Participation:* 10%

**Course Outline:**  
*Week 1:* The Sun, global-mean energy budget/balance  
*Week 2:* Latitudinal heating gradients, radiative transfer, radiative-convective equilibrium  
*Week 3:* Clouds, cloud-radiative feedbacks, surface heat fluxes  
*Week 4:* Surface energy balance models (e.g. slab ocean model), the hydrologic cycle.  
*Week 5:* Climate modeling, the atmospheric general circulation  
*Week 6:* **Exam 1,** Atmospheric general circulation continued: Stationary waves and transient eddies, heat transport, the angular momentum balance.  
*Week 7:* Summertime circulation patterns, monsoons, the wind-driven ocean circulation  
*Week 8:* The thermohaline circulation, ocean meridional energy transport.  
*Week 9:* Ocean-atmosphere coupled climate variability  
*Week 10:* Paleoclimate  
*Week 11:* Natural climate forcing and change  
*Week 12:* **Exam 2,** Climate sensitivity and feedbacks.  
*Week 13:* Anthropogenic climate change  
*Week 14:* The hydrologic cycle and climate change, changes in tropical transients including hurricanes  
*Week 15:* Regional climate change, the changing nature of ENSO  

**Statement on Academic Integrity**  
This course will adhere to the CSU Academic Integrity Policy as found in the General Catalog (http://catalog.colostate.edu/general-catalog/policies/students-responsibilities/#academic-integrity) and the Student Conduct Code (http://www.conflictresolution.colostate.edu/conduct-code). At a minimum, violations will result in a grading penalty in this course and a report to the Office of Conflict Resolution and Student Conduct Services.