

# **ATMOS 5000: Intro to Atmospheric Science**

## **Fall Term 2013**



*Syllabus Draft: Tuesday, Aug. 20<sup>th</sup>, 2013*

### **Course Description:**

An intermediate-level introduction to the atmospheric sciences for both atmospheric science majors and other scientists and engineers. Topics include the structure of atmosphere, atmospheric thermodynamics, cloud physics, radiative transfer, and atmospheric dynamics.



*(Photo credit: J. Lin)*

### **Prerequisites:**

- *MATH 1220*
- *PHYS 2210*
- *Eagerness to learn!*

### **Scheduled class time:**

Mon, Wed, and Fri:                    3pm to 4:20pm in WBB 820

### **Instructor**

*John C. Lin*

Associate Professor, Dept. of Atmospheric Sciences

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## Office Hours

By appointment

## Course Objectives

All of us have an intuitive appreciation for the power and grandeur of the atmosphere, and how intimately linked we are to it. The atmosphere is the fluid in which we live, breathe, and play, and whether we get to play or not depends on the atmospheric controls on the weather (beach volleyball versus a rainy day indoors, skiing on a sunny day outside versus huddling by the warm fireplace during a snowstorm).

The atmosphere behaves in a bewildering array of ways, ranging from the gentle breeze by the lake to violent, life-threatening winds in hurricanes. What causes these phenomena? And how will they change with climate change?

The overarching goal of ATMOS 5000 is to gain an understanding of atmospheric phenomena by making use of basic physics and chemistry. The next section lists the topics that will be covered in the course.

During lectures there will often be in-class problems, used to illustrate the main points of the lecture. A lot of times these problems will require calculations. Hence make sure you **bring a calculator or laptop** to class.

## Overview of Topics to be Covered

- What is atmospheric science?
- Physical properties of air
- Impact and role of water in the atmosphere
- Clouds
- Radiation, energy balance, greenhouse effect
- Buoyancy, convection, and stability in the atmosphere
- Wind and atmospheric dynamics
- General circulation of atmospheres

### If time allows:

- Atmospheric boundary layer
- Carbon cycle, CO<sub>2</sub>
- Ozone hole, stratospheric chemistry
- Air quality, tropospheric chemistry

## Grading

Problem Sets:	30%
Midterm Exam:	20%
Final Exam:	40%
In-class Paper Presentations:	5%
Class Participation:	5% (attendance and participation)

## Textbooks

*The lectures and the accompanying notes will serve as the core of the course. The following two textbooks will be useful as additional reading to help you understand the material. You will also see many cases when I drawn upon material directly from the textbooks. Relevant readings from the textbooks will be specified in the lecture slides.*

*Atmospheric Science: An Introductory Survey* by John W. Wallace and Peter V. Hobbs (Placed on reserve in Marriott Library)

Wallace and Hobbs presents a comprehensive treatment of atmospheric science, with particular strengths in atmospheric thermodynamics and microphysics.

*Atmosphere, Ocean, and Climate Dynamics* by John Marshall and R. Alan Plumb (available as electronic book via the Univ. of Utah library website: <http://lib.utah.edu>)  
Marshall and Plumb provides an intuitive understanding of atmospheric dynamics.

## Problem Sets

Problem sets will be assigned throughout the term. They are due **in class** on the specified deadline. To facilitate grading, provide **hard copies** of your solutions (either legibly hand written or typed). Collaboration is okay on problem sets. However, **make sure that you write up your own answers.**

## Late Policy

Score gets halved each additional day after the deadline. For instance, if an assignment is late by 3 days, then even if it garnered a perfect 100% score, it will be marked down by a factor of  $1/2^3=1/8$ , or  $100\%/8=12.5\%$ .

## Center for Disability Services

If you will need accommodations in the class, please give reasonable prior notice to the Center for Disability Services : <http://www.sa.utah.edu/ds/>

## **Faculty and Student Responsibilities**

All students are expected to maintain professional behavior in the classroom setting, according to the Student Code, spelled out in the Student Handbook. The Code prohibits cheating on tests, plagiarism, etc. Students should read the Code carefully and know they are responsible for the content.

## **Scheduling Accommodations:**

Except in cases of sudden illness or emergency, you shall in advance of any absence arrange with the instructor to make up materials. If you miss an exam or assignment due to illness, you must provide medical documentation (i.e., letter from doctor) in order to make up missed work.

*This syllabus is not a legally-binding contract. The instructor reserves the right to make modifications when the student is given reasonable advance notice.*