

# METEOROLOGY 61: Introduction to Meteorology

<b>Spring 2009</b> - San Jose State University M, W 12:30 – 1:45am (lecture) M, W 11:00-12:15 pm (lab) Duncan Hall 615 <a href="http://www.met.sjsu.edu/~cordero/met61/">http://www.met.sjsu.edu/~cordero/met61/</a>	Dr. Eugene Cordero Office: Duncan Hall 618 Phone: (408) 924-5188 Email: <a href="mailto:cordero@met.sjsu.edu">cordero@met.sjsu.edu</a> Office hours: Wednesday 4:00-6:00 pm, or by appointment.
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## **Course Description and Prerequisites:**

This course provides a quantitative introduction to atmospheric science for both meteorology majors and science and engineering students. Students will be exposed to the various components of the atmospheric sciences including thermodynamics, radiation, synoptics, physical meteorology, mesoscale and large-scale dynamics. The course is a survey of atmospheric science including a significant emphasis on developing problem solving skills, and thus moves along at a fairly quick pace. Students should leave the course with a good understanding of the different components related to atmospheric science, and a foundation for further studies in Meteorology.

The course has both a lecture and lab component. While the lectures will focus more on the theoretical aspects of meteorology, there will be a significant component of lecture devoted to problem solving and discussion. Therefore, students are expected to do the assigned reading and actively participate during class.

Metr 61 is the gateway class for Junior and Senior level meteorology classes. The prerequisites and co-requisites for this course include:

Metr 10, Metr 50, Metr 51 (co-requisite), Math 30p/31/32, Math 133 (co-requisite), Physics 50 and 52, Physics 51 (co-requisite) and Chem 1A.

Should you be missing any of these courses, you will need to discuss your situation with me before admission into the class is allowed.

## **Learning objectives**

Learning objectives are developed to assist students in understanding the main goals of the course. During the semester, teaching and learning activities are designed with these objectives in mind. Assessment activities play the role of measuring to what level students achieved these learning objectives. The particular learning objectives for this course include:

- To develop an understanding of the fundamental processes responsible for the structure and evolution of the atmosphere.
- To develop the analytical and technical skills necessary to solve a variety of atmospheric science related problems.
- To develop experience working with meteorological data.

## Assessment

Each student will be assessed based on a combination of activities, quizzes, midterms and a comprehensive final exam. Activities will include both in-class and take home components and will require both problem solving and written responses. The quizzes are short (approximately 15 minutes long), focus on current topics, and are designed to keep students up with the material. The midterms will contain material only from their corresponding section, while the final exam will contain material from the entire course.

Activities	25%
Quizzes	15%
Midterms (2)	30%
Final Exam	30%
<b>Total</b>	<b>100 %</b>

### **Grading Scale:**

90 - 100	A
80 – 89	B
70 – 79	C
60 – 69	D
Below 60	F

**Important:** Arrangements for missed midterms due to medical reasons (a medical certificate will be required) will need to be arranged privately. Quizzes cannot be made up.

## Reading materials

The course textbooks are: *Atmospheric Science: An Introductory Survey*, 2<sup>nd</sup> Edition (2006) by J. Wallace and P. Hobbs and *Meteorology for Scientist and Engineers*, 2<sup>nd</sup> Edition (2000) by Roland B. Stull. . It is **very important** that you do the assigned readings from this book prior to class, as in-class activities, quizzes and discussions will assume the reading has been completed. While I realize that purchasing two books is expensive, and not to mention heavy to carry around, these companion books should serve you well in both this class, and throughout your future studies in meteorology.

Additional reading material that may be helpful include:

Holton, J., 1992: *An Introduction to Dynamic Meteorology*, Academic Press, 511pp.

Riegal, C., *Fundamentals of Atmospheric Dynamics and Thermodynamics*, Ed. Bridger, World Scientific, River Edge, NJ, 07661.

### **Lecture Notes:**

Copies of the lecture overheads will normally be handed out at the beginning of each lecture. These may include copies of the overheads or additional information on a particular topic, and are intended to supplement the taking of notes in the class.

### ***Course Web Page:***

The course web page may be used to access additional information and as a communication tool.

**<http://www.met.sjsu.edu/~cordero/met61/>**

### **Activities**

There will be approximately one activity each week (~15 per semester) containing both in-class and take home components. Each activity will be worth 10 points, and will be due at the **beginning** of class on the announced date. No credit will be given for late activities.

### **Course Topics to Covered**

The following topics (1-9) will be covered in varying detail during the course. All listed chapters refer to “Meteorology Today” by Stull.

#### **Topic 1: Introduction (Chapter 1)**

The general atmosphere, meteorological conventions, equation of state, hydrostatic balance, atmospheric vertical structure, terminology.

#### **Topic 2: Atmospheric Thermodynamics (Chapter 3)**

The gas laws, hydrostatic relationship, first law of thermodynamics, adiabatic processes, water vapor, moisture variables and skew-T, static stability and the 2<sup>nd</sup> law of thermo.

#### **Topic 3: Radiative Transfer (Chapter 4)**

Blackbody radiation, radiative transfer and energy balance.

#### **Topic 4: Dynamics (Chapter 7)**

Newton’s 2<sup>nd</sup> law, primitive equations, dynamics of horizontal flow, general circulation.

#### **Topic 5: Weather Systems (Chapter 8)**

Extratropical cyclones, fronts, surface weather, orographic effects and tropical cyclones.

#### **Topic 6: Climate Dynamics (Chapter 10)**

Annual mean conditions, climate variability and the enhanced greenhouse effect.

### **Academic integrity statement from Office of Judicial Affairs:**

Your own commitment to learning, as evidenced by your enrollment at San José State University, and the University's Academic Integrity Policy requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the Office of Judicial Affairs. The policy on academic integrity can be found at [http://sa.sjsu.edu/judicial\\_affairs/index.html](http://sa.sjsu.edu/judicial_affairs/index.html).

### **Campus policy in compliance with the Americans with Disabilities Act:**

If you need course adaptations or accommodations because of a disability, or if you need special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with DRC to establish a record of their disability.