Course Description
A quantitative introduction to Atmospheric Science for Meteorology majors (catalog entry).

Lecture: 2 hours per week (2 units).

In this course (which continues in Spring as METR 61) students are introduced to a variety of concepts important to the understanding of our atmosphere, and its weather and climate. These include (Fall): the components of the Earth System, including the atmosphere; the structure and composition of the atmosphere; atmospheric thermodynamics; the transfer of radiation through the atmosphere (which leads to heating!); and clouds and cloud microphysics. In spring, the class continues with: forces and motions (winds); weather systems (mid-latitudes storms, hurricanes etc.); and climate and climate dynamics.

Pre- and co-requisites
Pre-req: MATH 30 or 30P. Co-req: MATH 31*, PHYS 50, METR 50
*Some students will already be taking MATH 32 and PHYS 52 during this semester.

Course Learning Objectives
Specific learning objectives for this course include:
• To become familiar with the basic structure of our atmosphere.
• To become familiar with the physics that underpins the behavior our atmosphere.
• To begin the process of developing a quantitative understanding of the atmosphere through the use of college-level physics and mathematics.
• To lay the foundation for future classes in Meteorology.

Course Content Learning Outcomes
Upon successful completion of this course, students will be able to:
1. Describe the basic structure of the atmosphere in terms of: distributions of temperatures, winds, water vapor, and clouds.
2. Understand how basic thermodynamic concepts relate to the study of the atmosphere.
3. Describe qualitatively the earth system, and the current and past climate of the earth.
4. Describe the processes whereby net radiation heats the earth system (atmosphere, oceans, and land surface).
5. Describe the processes involved in the formation of different cloud and precipitation types.
6. Successfully perform a variety of calculations that pertain to each of these areas.

Required Texts
Required:

Images online at: http://www.met.sjsu.edu/~clements/met60/images/ in case you want to print them for class etc.
**Strongly recommended:** *Essentials of Meteorology*, 5th Ed., by C. Donald Ahrens, Brooks/Cole Publ. (qualitative text used in MET 10)

**Bring to class**
1. Either bring the text itself, or print and bring the figures – we will discuss them in class.
2. Paper (OK/encouraged to use Dept. recycled paper) & pencil etc.
3. Calculator.

**Classroom Protocol & “how to do well in this class”**
This class will be the first step in preparing you for a successful career as a meteorologist. Your success in this class will be a strong indicator of success in the rest of the program – you should strive for a “B” or better in the class. We expect you to attend every class, arrive on time, have homework etc. ready at the start of class, bring appropriate materials (paper, pencils, colored pens, calculator), and behave in an appropriate manner (turn your cell phone to vibrate or all the way off, don’t read the paper, don’t browse SI on your iPhone etc.). I’d prefer if you did NOT sit in the way far back of the room.

Homework will be due at the start of class (i.e., don’t plan to complete it during class!) You may work in groups on the homework, but the final product that you turn in MUST be your own, with your own work and explanations.

**Assignments and Grading Policy**
Grades will be assigned based on quizzes, exams, homework and in-class activities, as follows:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Points (max.)</th>
<th>Weight towards grade (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekly 2-5 question quiz on Tuesdays (best ten scores)</td>
<td>50</td>
<td>10%</td>
</tr>
<tr>
<td>Quiz # 1 will be in the second week of classes</td>
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<td></td>
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<tr>
<td>Midterm # 1 (Thursday October 1)</td>
<td>100</td>
<td>20%</td>
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<tr>
<td>Midterm # 2 (Thursday November 12)</td>
<td>100</td>
<td>20%</td>
</tr>
<tr>
<td>Final (Thursday Dec 10, 0945-1200)</td>
<td>100</td>
<td>20%</td>
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<tr>
<td>Homework (most weeks)</td>
<td>100</td>
<td>20%</td>
</tr>
<tr>
<td>In-class activities (occasional)</td>
<td>50</td>
<td>10%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>500</td>
<td>100%</td>
</tr>
</tbody>
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Final grades will be assigned as follows: A=90-100%, B=80-89%, C=70-79%, D=60-69%, F=lower than 60%.

Note that scores within ± 2 percent of the cutoffs will receive ± grades. For example, a 91% would earn an “A-“, an 88% would earn a “B+”, while an 87% would earn a “B”.

**Late assignments will NOT be accepted.**

**Writing and Plagiarism**
Writing is an extremely important component to any subject knowledge as it communicates that knowledge to other people. Through the use of the internet, plagiarism has become an increasing problem on college campuses. Although it may seem amazing to you, some students believe that completing their homework requires scanning the internet (i.e. Google it), finding the answer and then cutting and pasting their answer into a word file with their name at the top. This is certainly not acceptable. This is one example of plagiarism and is considered unethical behavior at this university. SJSU is a learning
institution where the goal to develop freethinking students who can analyze new concepts and develop their own ideas and opinions. In order to discourage plagiarism, the course will adopt a zero tolerance approach. If submitted work is found to be plagiarized, the student (or students) overall grade will be lowered by 30% and their case will be submitted to the university judicial board for review. The password and account will be given in class.

**Plagiarism:** When you assume credit for something that someone else has written, that is stealing at this University. Academic integrity statement from Office of Student Conduct and Ethical Development: “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.

### Tentative Schedule

<table>
<thead>
<tr>
<th>“Week”</th>
<th>Topic</th>
<th>Readings (Wallace &amp; Hobbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>Introduction to Meteorology as a science; overview of material; review of material from MET 10 on the structure of the atmosphere</td>
<td>Ch. 1</td>
</tr>
<tr>
<td>2-3</td>
<td>Thermodynamics (TD); the First Law of TD</td>
<td>Ch. 3 pp. 63-79</td>
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<tr>
<td>3-4</td>
<td>Thermodynamics including moisture effects; static stability; the Second Law of TD</td>
<td>Ch. 3 pp. 79-101</td>
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<tr>
<td>5-7</td>
<td>Solar and infrared radiation basics</td>
<td>Ch. 4 pp. 113-130</td>
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<td>8-11</td>
<td>Radiative transfer; remote sensing by satellites</td>
<td>Ch. 4 pp. 130-145</td>
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<tr>
<td>12-14</td>
<td>Cloud microphysics processes; cloud water droplet growth; ice crystal processes; precipitation processes; cloud seeding</td>
<td>Ch. 6 pp. 209-251</td>
</tr>
<tr>
<td>15-16</td>
<td>Cloud electrification (lightning!)</td>
<td>Ch. 6 pp. 252-256</td>
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