

**ATOC 1050: Weather and the Atmosphere**  
**Summer A 2013**  
**MTWR 8:50-10:50AM**  
**Duane Physics G131**

**Contact Information**

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Office hours: Mon, Wed, Thurs; 11AM to 12PM (immediately after class)  
We can also meet by appointment (send me an email)

**Course Description**

Whether or not you are a trained meteorologist, you probably have an opinion on the weather. Sometimes it is positive (*Great powder in the Sawatch!*), and sometimes it is not (*This is the third time a thunderstorm has chased me off of Longs!*). A basic background in atmospheric science can help you determine which forecasts to trust, keep you safe in dangerous weather, and make you more informed in weather policy.

This course introduces the basic concepts of atmospheric science – types of energy, heat transfer, radiation, water and humidity, clouds and their development, air motions, storm systems, large scale weather patterns, and observing the weather. We will examine how these atmospheric systems are relevant to weather forecasting through analysis of current and past weather events.

*Prerequisites: This class is an introductory course and therefore has no formal college level prerequisites. Some basic arithmetic will be used at times to reinforce concepts. Certain assignments may require the use of Microsoft Excel. If you do not have access to the program, it is available in many CU computer labs.*

**Required Materials**

- Essentials of Meteorology: An Invitation to the Atmosphere by C. Donald Ahrens; Brooks/Cole; 6<sup>th</sup> edition; 2012.
- i>clickers are required for the class as questions will be used to assess your understanding of the material. They are available for purchase in the CU bookstore and can (and probably will!) be used for multiple classes.

**Course Website**

This course uses the Desire2Learn system (<http://learn.colorado.edu>); you can login using your identikey and password. In the *unlikely* event that the system is not working, I will email you relevant information. Otherwise, please look first at the website for all class materials including this syllabus, homework assignments, lecture slides, and other reference content.

## Additional Materials

- Severe and Hazardous Weather: An Introduction to High Impact Meteorology by Rauber, Charlevoix, and Walsh; Kendall Hunt; 4<sup>th</sup> edition; 2012.
- UCAR Comet MetEd Program – this website offers **free** modules on topics such as skew-T diagrams, mountain meteorology, fire weather, and many more. These modules are available at <https://www.meted.ucar.edu/>.

## Course Goals

1. Students will understand the basic principles of meteorology including what causes air to move around, how and why storms develop, why certain types of weather occur in particular places, and the scales of different types of weather.
2. Students will learn how to evaluate sources of weather information so that they know what to use and what forecasts to trust/avoid.
3. Students will learn how to think critically about scientific concepts and be able to spot common weather misconceptions/mistakes.

## How to Succeed in This Class

- Read the assigned sections of the textbook **before** the lecture in which they are due.
- Attend every class and ask questions when you are confused about a subject. It is likely that others in the class are also confused. I do not mind going over material a second time when necessary!
- Review the online lecture notes after each class.
- Complete each homework assignment on time and then use them as a study guide for the exams; questions on the exam will often resemble those in the homework!
- Whenever you reference a scientific measurement (temperature, pressure, wind speed, etc.), you must include units! Writing 23 for an answer is ambiguous and incorrect; writing 23°C is correct.
- Do not miss exams/presentations.

## Grading and Assessment

Your final grade in ATOC 1050 will consist of in-class participation (assessed using Clicker questions), in-class activities, four homework assignments, two tests, and a final project. Each assignment will be worth the following:

|                     | Percent Value |
|---------------------|---------------|
| Clicker questions   | 5%            |
| In-class activities | 15%           |
| Homework            | 30%           |
| Exams               | 30%           |
| Final Project       | 20%           |

Using your cumulative score from the above categories, you will be assigned a final letter grade using the following breakdown:

|           |           |           |           |           |          |
|-----------|-----------|-----------|-----------|-----------|----------|
| <b>A</b>  | <b>A-</b> | <b>B+</b> | <b>B</b>  | <b>B-</b> |          |
| 93-100%   | 90-92%    | 87-90%    | 83-87%    | 80-83%    |          |
| <b>C+</b> | <b>C</b>  | <b>C-</b> | <b>D+</b> | <b>D</b>  | <b>F</b> |
| 77-80%    | 73-77%    | 70-73%    | 67-70%    | 65-67%    | 0-65%    |

## Description of Assignments

**Clicker questions (5%)** – Multiple clicker questions will be presented during each class that features a lecture. These questions will be used to assess your comprehension of the material “on the fly.” Some questions, which will be noted during the lecture, will be worth two points – one for participation by clicking in an answer, and one for correctness. It is expected that you will not comprehend all of the material immediately. Therefore, if you *answer all questions and get 70+% of the clicker questions correct*, you will receive an A for your clicker grade. If a student is found clicking in for another student, both will be cited for cheating.

**In-class activities (15%)** – These activities will occur fairly regularly throughout the course (1-3 times per week). Each activity will expand on the concepts covered in the lectures and give you hands-on experience. All assignments will be worth the same amount of points. Unless otherwise noted, each activity will be due at the end of the class period. Therefore, *you must attend class to earn credit for these assignments!*

**Homework (4 x 7.5%)** – There will be a total of four homework assignments throughout the class, one per week for the first four weeks. Each homework assignment will consist of two parts: a review of the material presented in the last few lectures and a larger question designed to improve a relevant skill. You may collaborate on assignments but each student must turn in their own work (in their own words). Assignments should be typed and turned in using D2L.

**Exams (2 x 15%)** – Two exams will be administered, at the ends of the second and fourth weeks. These exams will be focused on the material presented in the preceding two weeks. However, as most concepts in atmospheric science are connected, you may be expected to utilize knowledge learned in any of the preceding material.

**Final project (20%)** – In lieu of a final exam, you will instead be tasked with creating a popular scientific article on a weather event or atmospheric process. You will work in groups and be expected to reference concepts taught throughout the class. During the final exam period (on July 5<sup>th</sup>), your group will give a short presentation about the article. More details will be provided on this assignment later in the semester.

## Classroom Etiquette

I expect you to show me and your fellow classmates the same respect you would expect for yourself. Please arrive to class on time and ready to pay attention. Laptops are allowed but should be used as a learning tool, not for checking Facebook/ESPN. Please refrain from using cell phones (*they are not valid calculators for exams!*). If you cannot follow these policies, you should drop this class.

## Late Work

It is my desire as your instructor to return assignments to you as quickly as possible. Remember, this class covers material that typically fills a 16-week semester. It is in your best interest to stay on schedule! Therefore, **no late assignments will be accepted and no make-up exams will be offered.** If you must miss an exam day, it is your responsibility to let me know ahead of the exam date, as you must complete the exam before that date.

## Tentative Class Schedule

This section will likely be modified as the class progresses. Check D2L for updates. **All readings and assignments should be completed by the beginning of the class period for which they are listed!**

|               | Material Topic                                       | Reading                 | Assignment       |
|---------------|--|-------------------------|------------------|
| <b>Week 1</b> |  |                         |                  |
| 3-Jun         | Class motivation; Weather tools; Reading plots       |                         | Register clicker |
| 4-Jun         | Atmospheric structure and temperature; Heat transfer | pp. 2-33                |                  |
| 5-Jun         | Radiation; Earth's seasons                           | pp. 34-54               |                  |
| 6-Jun         | Air temperature                                      | pp. 56-79               | HW 1             |
| <b>Week 2</b> |  |                         |                  |
| 10-Jun        | Moisture (Humidity and condensation)                 | pp. 82-102              |                  |
| 11-Jun        | Stability; Clouds                                    | pp. 118-127,<br>102-112 |                  |
| 12-Jun        | Precipitation types and processes                    | pp. 128-146             |                  |
| 13-Jun        | Q&A; Exam 1  |                         | HW 2             |
| <b>Week 3</b> |  |                         |                  |
| 17-Jun        | Air pressure; Air motion force balances              | pp. 148-174             |                  |
| 18-Jun        | Global wind systems; ENSO and CO weather             | pp. 178-179,<br>193-210 |                  |
| 19-Jun        | Air masses and fronts                                | pp. 212-233             |                  |
| 20-Jun        | Storm systems  | pp. 233-242             | HW 3             |
| <b>Week 4</b> |  |                         |                  |
| 24-Jun        | Local wind systems; Mountain weather; Chinooks       | pp. 180-193             |                  |
| 25-Jun        | Specific weather topics                              | TBD                     |                  |
| 26-Jun        | TBD  | TBD                     |                  |
| 27-Jun        | Q&A; Exam 2  |                         | HW 4             |
| <b>Week 5</b> |  |                         |                  |
| 1-Jul         | Observing the weather; Instrumentation               | TBD                     |                  |
| 2-Jul         | Weather forecasting                                  | pp. 244-270             |                  |
| 3-Jul         | Weather forecasting; Wrap-up                         |                         |                  |
| 4-Jul         | Holiday! No class!                                   |                         |                  |
| 5-Jul         | Project presentations                                |                         | Proj. Write-up   |

## Course and University Policies

**Disability considerations** – If you qualify for accommodations because of a disability, please submit to me a letter from Disability Services within two weeks of an exam so that your needs may be addressed. Disability Services determines accommodations based on documented disabilities.  
Contact: 303-492-8671, Willard 322, and [www.Colorado.EDU/disabilityservices](http://www.Colorado.EDU/disabilityservices).

**Religious observance** – Campus policy regarding religious observances requires that faculty make every effort to reasonably and fairly deal with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. See me if special consideration is required. See full details at [http://www.colorado.edu/policies/fac\\_relig.html](http://www.colorado.edu/policies/fac_relig.html).

**Classroom behavior** – Students and faculty each have responsibility for maintaining an appropriate learning environment. Students who fail to adhere to such behavioral standards may be subject to discipline. Faculty have the professional responsibility to treat all students with understanding, dignity and respect, to guide classroom discussion and to set reasonable limits on the manner in which they and their students express opinions. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender variance, and nationalities.

Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records.

See policies at <http://www.colorado.edu/policies/classbehavior.html> and at [http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student\\_code](http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code).

**Honor code** – All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of academic misconduct shall be reported to the Honor Code Council ([honor@colorado.edu](mailto:honor@colorado.edu); 303-725-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). Other information on the Honor Code can be found at <http://www.colorado.edu/policies/honor.html> and at <http://honorcode.colorado.edu/>.

**Anyone caught violating the honor code in this class will receive a final class grade of F. There are no exceptions to this policy.**

**Discrimination and Sexual Harassment** – The University of Colorado at Boulder policy on Discrimination and Harassment, the University of Colorado policy on Sexual Harassment and the University of Colorado policy on Amorous Relationships apply to all students, staff and faculty. Any student, staff, or faculty member who believes s/he has been the subject of discrimination or harassment based upon race, color, national origin, sex, age, disability, religion, sexual orientation, or veteran status should contact the Office of Discrimination and Harassment (ODH) at 303-492-2127 or the Office of Judicial Affairs at 303-492-5550. Information about the ODH and the campus resources available to assist individuals regarding discrimination or harassment can be obtained at <http://www.colorado.edu/odh>.