Syllabus - Mountain Weather and Climate

ATMOSPHERIC SCIENCES 3200/GEOGRAPHY 3280

Classroom: WEB L102  
Hours: T/H 9:10-10:30 am  
Office hours: T/H 10:30-noon, or by appointment  
Instructor: Sebastian Hoch  
Office: INSCC 485  
Tel: 801-581-7094  
E-mail address: sebastian.hoch@utah.edu

Text: "Mountain Meteorology" - by C. David Whiteman 
Personal website my webpage 
ATMOSPHERIC SCIENCES 3200/GEOGRAPHY 3280 website: http://www.inscc.utah.edu/~hoch/ATMOS_3200_SS2020/

Course Goals:

This course will provide a broad overview of mountain weather and climate. We will investigate how mountains help to control the weather and climate throughout the western United States. What causes the snow in the Wasatch Mountains to be "the greatest snow on earth"? How can the best places for paragliding and wind surfing be determined? Can clouds be used to estimate winds and stability over nearby mountain peaks? How does the Great Salt Lake interact with the local terrain to develop lake-effect snowstorms? The class will use lectures, in-class discussions, homework assignments, a term paper assignment, and the text (Mountain Meteorology by C. David Whiteman) to meet the course objectives.

There are no prerequisites for the course, but it will require application of basic math and reasoning skills.

Material covered in this course is applicable to many other disciplines, such as air pollution, wind energy, road weather, avalanches, and fire weather.

Course Outline:

- Introduction
- Mountain weather phenomena
- Mountains
- Observing the atmosphere
- Mountain Climates
- Identifying fogs and clouds
- Atmospheric scales of motion and composition
- Atmospheric structure
- Atmospheric Stability
- Surface energy budget
- The atmospheric boundary layer
- Pressure and winds
- Air masses and fronts
- Data, weather maps and forecasting
- Precipitation and ice crystals
- Cold-air pools
- Terrain-forced flows
- Diurnal mountain winds
- The winter snow pack and snow avalanches
• Mountain aviation
• Fire weather

**Class Expectations:**

Substantial additional time outside of class (2-3 hours outside for one hour inside is a rough guideline) is expected to complete reading, homework assignments and studying for quizzes and tests. Most important learning will take place when you seek relevant information on your own and apply the material discussed in class. You are expected to prepare for class in advance - you should come to class ready and willing to participate in class and small-group discussions. This class promotes active learning - expect to become immersed in the subject rather than simply sitting through lectures and being evaluated on the basis of a couple of exams. You will have the opportunity to use interactive computer modules (http://meted.ucar.edu) to explore subjects in more depth.

**Grading:**

Grades will be based upon your performance on the assignments, exams, and a term paper. Students will give a short oral presentation of their term paper topics to the class in the last days of the semester. You are encouraged to work on assignments with other students, but do not copy from anyone. Due to the number of people enrolled in the course, late assignments will not be accepted unless prior arrangements are made; turn in as much as you get done by the deadline. I am available during office hours or by appointment to assist you, if necessary. The weighted contribution of each of these items to your final grade is given below:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Assignments</td>
<td>20%</td>
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<tr>
<td>Midterm 1</td>
<td>20%</td>
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<tr>
<td>Midterm 2</td>
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<tr>
<td>Final Exam</td>
<td>25%</td>
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<tr>
<td>Term paper / project (written and oral combined)</td>
<td>15%</td>
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<tr>
<td><strong>total</strong></td>
<td><strong>100%</strong></td>
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Final grades are based on the following scale:
> 90 % guarantees an A or A-
> 80 % guarantees a B+, B, or B-
> 70 % guarantees a C+, C, or C-
> 60 % guarantees a D+, D, or D-
< 60% results in an E

Sometimes cutoff points are adjusted to produce more natural break-points and a reasonable distribution of grades, but please don't count on it.

**Other Class Policies:**

Students must take every exam with exceptions governed by University Policy. Plagiarizing, copying, cheating or otherwise misrepresenting ones' work will not be tolerated and will be dealt with as harshly as permitted under University Policy. Do not break the scientific code of honor.
I may take attendance to determine your level of participation in the class. Keep in mind that this
course moves at a rapid pace. Missing just one class can result in a lack of understanding in
future classes. In addition, some course material that you are responsible for will only be
presented during lectures (i.e., will not be found in the text). Pop quizzes may occasionally be
given to determine your level of preparation and your understanding of past material. Attendance,
class participation and performance on pop quizzes will contribute to the Assignments (20%)
grading. If you become ill or anticipate having an absence that can be excused please contact me
before you miss class, if at all possible.

ADA Accommodations:

The University of Utah seeks to provide equal access to its programs, services, and activities for
people with disabilities. If you will need accommodations in the class, reasonable prior notice
needs to be given to the Center for Disability services, 162 Olpin Union Building, 581-5020
(V/TDD). CDS will work with you and the instructor to make arrangements for accommodations.
All written information in this course can be made available in alternative format with prior
notification to the Center for Disability Services.