

**Atmospheric Sciences 5200**  
**Physical Meteorology III: Cloud Physics**  
**Fall 2016, Second Half**

**Instructor:** Professor Steven K. Krueger  
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**Description:** The emphasis in this course will be on developing a better understanding of cloud formation and precipitation, including the microstructure of clouds and precipitation the growth of cloud droplets in warm clouds the microphysics of cold clouds, and turbulence and mixing in clouds.

**Prerequisites:** ATMOS 5000

**Classroom:** WBB 820

**Class Hours:** M W 11:50 to 1:10

**HELP!** MW 2:15 to 3:00, or by appointment. Email works well.

**Holidays:** (none)

**Classes that may be rescheduled:** (none)

**Last day of class:** Dec 7

**Final exam:** Tuesday, December 13, 10:30 am – 12:30 pm

**Format:** Primarily lecture and weekly assigned problem sets. The students will use MATLAB programming skills to solve problems and to present results in graphical form.

**Grading:** The course grade will be determined from problem sets (70%) and a final exam (30%).

The grading scale will be A:  $\geq 90$ , B: 80-89, C: 70-79, D: 60-69, F:  $< 60$ .

**Class policies:** Students must take every exam with exceptions governed by University Policy. Plagiarizing, copying, cheating, or otherwise misrepresenting one's work will not be tolerated.

Missing class will not be penalized directly, but usually results in poor problem set and exam performance. Some course material that you are responsible for will only be presented during lectures (i.e., will not be found in the text or online notes).

Homework is due at the start of class on the due date, unless otherwise noted. *Late homework will not be accepted.*

**Required Textbooks:** *Atmospheric Science: An Introductory Survey, Second Edition* by J. M. Wallace and P. V. Hobbs; *A Short Course in Cloud Physics, 3rd edition* by R. R. Rogers and M. K. Yau;

**Supplementary Material:** *Thermodynamics Notes for Meteo 3510*, by S. K. Krueger.

**Topics to be Addressed:**

- Thermodynamics and Dynamics of Clouds
  - Parcel model
  - Entrainment
  - Buoyancy and drag
  - Second law of thermodynamics and entropy
- Cloud Microphysics
  - Microstructure of clouds and precipitation
  - Growth of cloud droplets in warm clouds
  - Microphysics of cold clouds
  - Turbulence and mixing in clouds

**Disability Services**

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.