

**AT541**  
**Daily Weather Laboratory II**  
**Spring Semester 2010**

**Meeting Times:**

Tuesday and Thursday: 1:00-3:00 pm  
Room: ATS 101

**Instructor:**

Sue van den Heever  
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**Teaching Assistant:**

Rob Seigel  
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Office Hours: Thursday 11:15-12:15

**Course Description:**

The primary goal of AT541 is to introduce you to the structural, dynamic and thermodynamic characteristics of mesoscale weather phenomena. Aspects of synoptic-scale meteorology will however be included where applicable to mesoscale systems. Emphasis in class will be on understanding the physical and dynamical processes through analysis and interpretation, rather than on forecasting rules. Post-analysis of specific mesoscale events (e.g. mesoscale convective systems, downslope wind storms, jet streaks, low-level jets) may be carried out if suitable cases occur during the semester, if data coverage is good and if time permits.

The course consists of four hours of class per week, with about one hour of lecture and one hour of lab on each day. A two-part, scored but non-graded forecasting contest will also be held, separated by the mid-term exam. In-class weather briefings will be given by students as part of the forecasting contest. Each student can expect to lead 2-3 discussions over the course of the semester. While the forecasting contest will not affect your grade, participation is expected.

**Required Reading:**

Lecture notes from the web:  
<http://reef.atmos.colostate.edu/~sue/vdhp/login541.php>

These notes are based on those developed by Dr R.H. Johnson who previously taught this class.

### **Other Useful (but not required) Textbooks:**

- Synoptic-Dynamic Meteorology in Midlatitudes, Vol I and II: Observations and Theory of Weather Systems (1993) by Howard Bluestein
- Storm and Cloud Dynamics (2010) by William R. Cotton, G.H. Bryan and S.C. van den Heever
- Cloud Dynamics (1994) by Robert Houze
- Atmospheric Science: An Introductory Survey (2006) by John Wallace and Peter Hobbs

### **Lab Information:**

The labs are designed to support the lectures with more in-depth study and practical applications. The objective of the labs is to provide a background in basic weather analysis and forecasting.

#### Meeting Times

The labs will begin a few minutes after the lecture section and weather discussion.

Tuesdays: Introduce and assign lab exercise.

Thursdays: Review concepts and discuss questions pertaining to the lab.

#### Lab Exercises:

- Assigned Tuesdays
- Due Friday of the same week or Friday of the following week depending on the length of the lab

#### Weather Discussions:

- Given after the lecture.
- Presented by students starting a couple weeks into the semester.

#### Forecasting Competition:

- Forecasting competition for Fort Collins and an out of state city
- Will begin several weeks into the semester

### **Grading:**

Mid-term exam: 25%

Final exam: 35%

Labs: 40%

**Course Outline:**

Chapter 1: Introduction and Definitions

Chapter 2: Climatology of Fort Collins

Chapter 3: Mesoanalysis Techniques

Chapter 4: Vertical Motion

Chapter 5: Fronts and Frontogenesis

Chapter 6: Mountain Valley Circulations

Chapter 7: Mountain Waves and Downslope Windstorms

Chapter 8: Jets, Damming and Trapped Disturbances

Chapter 9: PV and Rossby Waves

Chapter 10: Snowstorms and Snowbands

Chapter 11: Convective Processes

Chapter 12: Mesoscale Convective Systems

Chapter 13: Hailstorms and Flash Floods

## Tentative Class Calendar

Dates	Topics	Labs
Tu Aug 24	No Class	
Th Aug 26	No Class	
Tu Aug 31	Introduction and Definitions	
Th Sep 2	Climatology of Fort Collins	
Th Sep 2	Mesoanalysis Techniques	
Tu Sep 7	Mesoanalysis Techniques	Lab 1: Mesoanalysis and Vertical Motion
Th Sep 9	Vertical Motion	
MAKEUP	Vertical Motion	
Tu Sep 14	Fronts and Frontogenesis	
Th Sep 16	Fronts and Frontogenesis	
Tu Sep 21	Mountain Valley Circulations	Lab 2: Fronts and Frontogenesis
Th Sep 23	Mountain Valley Circulations	
Tu Sep 28	Mountain Waves and Downslope Windstorms	Lab 3: Mountain Flows
Th Sep 30	Mountain Waves and Downslope Windstorms	
Day TBD	Jets, Damming and Trapped Disturbances	Exam Review
<b>Th Oct 7</b>	<b>Mid-Term Exam</b>	
Day TBD	Jets, Damming and Trapped Disturbances	Lab 4: Jets and Damming
Day TBD	PV and Rossby Waves	
Tu Oct 19	PV and Rossby Waves	
Th Oct 21	Snowstorms and Snowbands	
Day TBD	Snowstorms and Snowbands	Lab 5: Snowstorms
Day TBD	Convective Processes	
Tu Nov 2	Convective Processes	
Th Nov 4	Convective Processes	
Tu Nov 9	Convective Processes	Lab 6: Convective Processes
Th Nov 11	Convective Processes	
Tu Nov 16	Convective Processes	
Th Nov 18	Mesoscale Convective Systems	
<b>Nov 22-26</b>	<b>Thanksgiving Break</b>	
Tu Nov 30	Mesoscale Convective Systems	Lab 7: MCSs
Th Dec 2	Mesoscale Convective Systems	
Tu Dec 7	Hailstorms and Flash Floods	Exam Review
Th Dec 9	Hailstorms and Flash Floods	
<b>Dec 13-17</b>	<b>Finals Week</b>	