

METEO 414
Mesoscale Meteorology
Spring 2005

Instructor: John H. E. Clark, 513 Walker,
e-mail: clark@ems.psu.edu
Office Hours: TR, 9:00-11:00 AM.

Lectures: MWF, 11:00-11:50 AM in 529 Walker

Labs: MWF. 12:00-1:00 PM in 608 Walker

Teaching Assistants: John Stonitsch, 410 Walker
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Textbook: Notes prepared by Dr. Markowski
(available at <http://met.psu.edu/~marko/meteo414/notes.html>;
user: meteo414, password: 5000cape)

Prerequisite: METEO 411

Grading: Your final point total will be based on the following formula:

Labs:	40%
Mid-Term Exams (Feb 14 & April 1):	30%
Final Exam:	30%

The following guidelines will determine the final grade:

A	85-100%
B	70-85%
C	60-70%
D	50-60%
F	< 50%

Exam Policy: You will be allowed to make up an exam only for reasons that are pre-approved PRIOR to the exam. All make-up exams will be ORAL.

Course Description and Objectives: The goal of this course is to help you gain an understanding of a variety mesoscale weather systems. You will study the structure of these systems and the processes that control their development and evolution. You will also improve your skills at using available weather information through hands-on laboratory exercises.

Lecture Schedule:

January 10	Introduction to the Mesoscale
January 12	Soundings (skewT diagrams)
January 14	Dynamics review
January 17	Dynamics review
January 19	Boundary Layers (the PBL)
January 21	Boundary Layers (the PBL)
January 24	Stability Indices
January 26	Stability Change
January 31	Parcel Theory & Its Departures
February 2	Mixing & Momentum Exchange
February 4	Drylines & Capping Inversions
February 7	Circulations Associated with Differential Terrain Heating
February 9	Convective Initiation
February 11	Convection & Thunderstorm Processes
February 14	Exam # 1
February 16	Mesohighs & Lows; Density Currents and Gust Fronts
February 18	Multi-Cell Storms & Squall Lines
February 21	Long-Lived Squall Lines (RKW Theory)
February 23	Derachos & Downbursts
February 25	Supercell Storms
March 2	Supercell Storms
March 4	Tornadoes (observations)

Spring Break

March 14	Tornadoes (theory)
March 16	Mesoscale Convective Complexes (MCCs)
March 18	Mesoscale Convective Complexes; MCV Formation
March 21	Flash Floods

March 23	Hailstorms
March 25	Forecasting Ordinary & Severe Convection
March 28	Radar Fundamentals
March 30	Doppler Radar Fundamentals
April 1	Exam # 2
April 4	Symmetric Instability (SI)
April 6	Conditional Symmetric Instability (CSI)
April 8	Shearing Instabilities in the PBL
April 11	Internal Gravity Waves
April 13	Gravity Wave Ducting
April 15	Downslope Winds & Mountain Waves
April 18	Cold Air Damming
April 20	Coastal Fronts & Coastal Cyclogenesis
April 22	Upslope Snowstorms
April 25	Lake Effect Precipitation
April 27	Satellite Analysis of Mesoscale Structures
April 29	Review

Statement on Academic Integrity:

Academic integrity is the pursuit of scholarly activity in an open, honest and responsible manner. Academic integrity is a basic guiding principle for all academic activity in the College, and all members of the College are expected to act in accordance with this principle. Consistent with this expectation, all students should act with personal integrity, respect other students' dignity, rights and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts. Academic integrity includes a commitment not to engage in or tolerate acts of falsification, misrepresentation, or deception. Such acts of dishonesty violate the fundamental ethical principles of the EMS community and compromise the worth of work completed by others. The full college policy on academic integrity can be found at

<http://www.ems.psu.edu/students/integrity/statement.html>

Any student in this course who has a disability that may prevent him or her from fully demonstrating his or her abilities should contact me as soon

as possible so that accommodations necessary can be made to ensure full participation and to facilitate your educational opportunities.

