

MET-2110: Weather Data and Analysis
Fall 2005
Dr. Jason "Jay" Shafer

MW 10:05-12:05 AM or MW 3:00-5:00PM
Vail 449

WEATHER DATA AND ANALYSIS SYLLABUS

COURSE DESCRIPTION: This course introduces the various types of weather data and their meaningfulness to understanding the weather. In order to predict weather, one must have a firm understanding of the past and present weather. This class provides an overview of different weather data and provides the tools to analyze and interpret such data so that one can construct their own forecasts.

COURSE OBJECTIVES: Upon completion of this class, students should be able to:

- a) Use different types of weather data (surface, upper-air, satellite, and radar) to accurately diagnose past and present weather.
- b) Conduct analyses that apply theoretical principles and conceptual models, using various computer software packages, in analyzing current weather data.
- c) Forecast the weather over the next 0-12 hours using only observations, and forecast 0-36 h major variations in temperatures and quantitative precipitation using both observations and numerical model data.

EXPECTATIONS:

I expect students to ask questions and be curious about how the atmosphere works. In the process of learning about the atmosphere, I expect us to use critical thinking skills and scientific reasoning. This process will be difficult, but I expect a sincere effort from everyone. I believe that the teacher provides the tools for students to build their understanding and that the teacher provides guidance as to how to use these tools.

CLASS WEBPAGE: <http://apollo.lsc.vsc.edu/cgi-bin/classes/met2110/met2110.cgi>

USEFUL REFERENCES (not required):

Weather Maps, P.Chaston, Chaston Scientific, 1997.

Severe and Hazardous Weather, R. Rauber, J. Walsh, and D. Charlevoix, Kendall/Hunt Publishing, 2002.

MATERIALS:

Colored pencils (see bookstore), #2 pencils, large soft eraser, and a straight edge

GRADING/ASSESSMENT:

The traditional grade system (A-F) will be used for this class. Specifically,

92.5-100%	A	89.5-92.4%	A-	86.5-89.4%	B+	82.5-86.4%	B
79.5-82.4%	B-	76.5-79.4%	C+	72.6-76.4%	C	69.5-72.4%	C-
66.5-69.4%	D+	62.5-66.4%	D	59.5-62.4%	D-	below 59.5%	F

Your grade will be based on the following weightings:

Homework: 15%

Labs: 20%

Quizzes (3): 15% - Sept 14, Oct 12, Oct 26

Tests (2): 20% - Sept 28, Nov 16

Final Exam: 15% 10AM Class: (Wed 12/14 10:15-12:15AM)

3PM Class: (Fri 12/16: 2:45-4:45PM)

Participation: 15% (classroom discussions, weather briefing)

- Local forecast contest: Every Monday & Wednesday beginning Sept 5, you are strongly encouraged to participate – further information about this will be given during the first week of class
- Weather briefing: you are required to attend at least seven briefings this fall semester – briefings will be held in Vail 449 Tuesday 3-3:30PM, Thursday 12:30-1, and Friday 11:30-12. Don't forget to sign in if you show up.

EXTRA CREDIT:

Students may obtain extra credit by participating in the national forecast contest. You must participate for at least eight periods and miss no more than 10 forecasts overall to qualify for additional credit. You will receive an additional 3 points on your final grade for this participation. If you finish in the top 50% (25%) (10%) for your category, you will receive an additional 4 (5) (6) points to your final grade. In addition, for every period/city that you win in your category, you will receive an additional point. Information about the national contest will be given during the first week of class.

LATE/MISSED WORK:

For every day a lab or homework assignment is late, 10 points (one letter grade) will be deducted. If you miss class, you are responsible for getting any missed assignments and notes.

ATTENDANCE: Students are expected to attend class; role will only be called at the beginning of the semester to verify rosters. However, an unexcused absence on the day of a test or quiz will result in a zero grade. The only valid reasons (with appropriate written documentation) for an excused absence are as follows:

- a) Illness documented by a physician
- b) Participation in the college-sponsored activity

- c) Death of a family member
- d) Jury duty
- e) Inclement weather

COMPUTER ETIQUETTE: Non-educational use of the computers during class time will not be tolerated. It is rude and detracts from the learning environment. Non-educational uses may include surfing the web, chatting with friends, or playing games. Every instance this behavior is observed, you will lose 0.5 points off of your final class grade.

CLASSROOM ENVIRONMENT: Nobody knows everything about the atmosphere. With this in mind, we encourage an open, non-threatening environment in which everyone is free to be curious and ask questions. When you have questions or don't understand something, please don't be shy. We will learn a lot from each other.

STUDENTS WITH DISABILITIES:

Lyndon is committed to providing a broad spectrum of accommodations for students with documented disabilities. Within the resources of the college, we are prepared to provide accommodations that are appropriate for the nature of the disability and the course. Any and all disabilities must be documented; please take care of this documentation as soon as possible so that we can promptly accommodate your situation.

OFFICE HOURS: My scheduled office (Vail 434) hours are:

Tuesday 1:30-2:50

Thursday 10:30-12:05

Friday 10:00-11:30

However, I'm always willing to help so please stop by at any time. During non-office hours, you may want to send an e-mail: jason.shafer@lyndonstate.edu or call 626-6225 ahead to make sure I'm available.

This syllabus is subject to change with notice.

MET 2110 OUTLINE

1. Maps, perspective, and patterns
 - a) Horizontal (plan-view)
 - b) Cross sections
 - c) Scales
 - d) Connections between data: Synthesizing data
2. Surface data
 - a) Local and regional geography, data coverage
 - b) Station model
 - c) METAR
 - d) Interpreting observations
3. Basic forecasting methods
 - a) Persistence
 - b) Climatology
 - c) Continuity/Extrapolation/Trend
 - d) Introduction to Numerical Weather Prediction
4. Surface analysis
 - a) Isobars: cyclones and anticyclones
 - b) Isallobars
 - c) Isotherms
 - d) Fronts and air masses
 - e) Clouds and weather
 - f) Isodrosotherms
 - g) Conceptual wave-cyclone model
5. Satellite data and clouds
 - a) Basic cloud types
 - b) Theory: Infrared, water vapor, and visible channels
 - c) Satellite imagery analysis to determine cloud type, coverage, and wind
6. Radar data
 - a) WSR-88D network

- b) Local and national coverage
 - c) Reflectivity and velocity
7. Upper-air data
- a) Radiosonde network
 - b) Wind profilers, Velocity Azimuth Display (VAD), ACARS
 - c) Analysis of wind, temperature, and moisture
 - d) Basic patterns: ridge, trough
 - e) Relationship of the upper-levels to the surface
8. Vertical stability
- a) Stability states
 - b) Diagnosing (thermodynamic diagram)
 - c) Application: convective and stratiform precipitation, precipitation type
 - d) Relationship of stability to middle latitude cyclones
9. Vertical motion
- a) Relationship to ridges, troughs, and the jet stream
 - b) Relationship to middle latitude cyclones
 - c) Advanced diagnosis (vorticity and temperature advection)
10. Precipitation forecasting
- a) Moisture
 - b) Instability
 - c) Lift
 - d) Relationship to middle latitude cyclones
11. Advanced forecasting methods
- a) Conceptual models
 - b) Experience – pattern recognition
 - c) Numerical model output

Computer software topics:

1. GEMPAK (General Meteorological PAcKage)
2. World-Wide Web Resources
3. McIDAS (Man computer Interactive Data Access System)