ATMS 410 AND 410.L Synoptic Meteorology I

Course Elements & Grading

Two tests (20% each): open book, designed to test overall understanding of material, integral part of learning experience, applying concepts learned in lecture to real world situations, some mathematical problems

Weekly lecture quizzes (30%): closed book, designed to emphasize basic concepts & terminology. Quizzes should be taken at the scheduled time. Missed quizzes should be made up within one week or points may be deducted.

Homework (20%): real world examples of lecture topics, utilizes skills learned in ATMS 205, some mathematical problems. Homework assignments are due one week from when they are given. Assignments turned in late may have points deducted.

Weather forecasts (10%): each class day you will make a forecast for the Asheville Airport. This will include the predicted high, low, and category of precipitation for the 24 hour period midnight to midnight for the next day. Your forecast grade will be determined based on comparisons between students and with the GFS MOS forecasts. The base score for the MOS forecasts will be 80.The latest time a forecast can be submitted or amended is **5PM**. You can submit the forecast either in writing or by e-mail. Missed forecasts can not be made up. You will be given the highest score of your classmates.

Student Map Discussions

Shortly into the semester, you, the students, will take over the map discussions. These are to prepare you for this part of the Senior Comps in the spring. No grade will be given for these.

Course Objectives

Synoptic Meteorology I & II were designed to be the Acapstone@ courses of the ATMS curriculum. They incorporate both the mathematical and applied aspects of the science into one (hopefully) coherent package. The goal is to provide an understanding of how the atmosphere operates. They should answer questions about how weather systems develop and move. It is this understanding of the weather which separates a Ameteorologist@ from a Aweather forecaster@.

Your Instructor

Dr. Ed Brotak, Professor, Atmospheric Sciences Dept. Office: RBH 234 Office Phone: 232-5160

Office Hours: TR 1:00 - 1:45

E-mail: brotak@unca.edu (The best way to get in touch with me.) Home phone: 645-6298

I will e-mail you course notes, some of the homeworks, forecast scores, the tests, etc. For this to work, **you must use your school account.**

Lecture Outline and Readings

Text: Synoptic-Dynamic Meteorology in Midlatitudes, Vol. II by Bluestein

Course notes will also be provided.

Tropical Weather Systems

General Circulation & Energy Budget of the Atmosphere

Waves or Oscillations in the Tropical Atmosphere

- Madden-Julian Oscillations
- Quasi-Biennial Oscillation
- Southern Oscillation: El Nino & La Nina

Disturbances in the Tropics

- Open Waves and Tropical Squall Lines
- Tropical Vortices
  - Monsoon Depressions
  - Subtropical Cyclones
  - Tropical Cyclones
    - Characteristics
    - Formation
    - Structure
    - Energy Budget
    - Movement
    - Dissipation
    - Transformation into Extratropical Cyclones
    - Tracking
    - Modification
    - Forecasting Atlantic Tropical Cyclone Activity
    - Operational Track and Intensity Forecasting

Midlatitude Weather Systems

Upper-Level Systems (55-112, 208-219)

- Climatology of Ht. & Temp. Above the Sfc. in the Troposphere
- Controlling Mechanisms for the Basic Upper-Level Pattern
- The Formation of Upper-Level Systems
- Movement of Upper-Level Troughs & Ridges
- Types of Troughs
- Upper-Level Closed Highs & Lows

Tropospheric Jet Streams (238-240, 378-397)

- The Relationship between Fronts & Jets
- Jet Streaks
- Vorticity, Divergence, & Jet Streams
- Effects of Wind Speed Maxima on Troughs
- The Polar Jet
- The Subtropical Jet
- Low-Level Jet Streams

Synoptic I Assignment

What are your future plans and what steps have you taken and plan to take to achieve your goals?