ATMS 411 SYNOPTIC METEOROLOGY II

Grading

Same as last semester: two take-home tests (20% each), weekly lecture quizzes (30%), homework (20%), weather forecasts (10%).

Homework assignments are due one week from when they are given unless otherwise noted. Assignments turned in late may have points deducted.

Quizzes should be taken at the scheduled time. Missed quizzes must be made up within one week or points may be deducted.

The forecasts are the same as last semester. The 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.

Normal 10 point scale will be used. Depending on the grade distribution, I may scale grades slightly and use + and - grades.

Student Map Discussions

Student map discussions will resume shortly; no grade will be given. Senior Comp map discussions will be announced later in the semester.

Your Instructor

Dr. Ed Brotak, Professor, Atmospheric Sciences Dept.

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I will again use the Campus Pipeline to e-mail you course notes, some of the homeworks, forecast scores, etc.

Lecture Outline and Readings

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

Lecture notes will also be provided.

Topics

Surface Pressure Systems (3-54, 112-207)

- Formation of Surface Pressure Systems
- Movement of Surface Pressure Systems
- Climatology of Cyclones & Anticyclones over North America

Cyclogenesis

- Historical Perspectives of Cyclogenetic Theories
- The Norwegian Cyclone Model
- Petterssen's Development Equation
- Case Studies of Developing Systems
- Cyclogenesis & Upper-Level Troughs
- Other Mathematical Concerns
  - The Balance Equation
  - Isentropic Potential Vorticity
- Special Types of Cyclogenesis
- Regional Cyclogenesis

Clouds & Precipitation Production and Patterns in Extratropical Systems

Fronts

- Air Masses
- Surface Fronts
  - Definition
  - Frontogenesis
  - Types of Surface Fronts
    - Cold Front
    - Warm Front
    - Stationary Front
    - Occluded Front
    - Coastal Front
- Upper-Level Fronts
  - Definition
  - Frontogenesis
  - Tropopause Features
  - Vertical Motions

Convection in Midlatitudes

- Soundings and Convection
- Convection Defined by Synoptic Situation
  - Non-Organized Convection
  - Organized Convection
- Mesoscale Convective Systems
  - Squall Lines
    - Bow Echoes
    - Derechoes
  - Mesoscale Convective Complexes
- Types of Thunderstorms
  - Supercells
  - Development and Structure
- Straight Line Winds with Thunderstorms
- Tornadoes
  - Relationship to Mesocyclone
  - Development
  - Characteristics
  - Other Types