Class meetings (all in 3128):
Lecture: W 11:00-11:50 pm 
Labs: MWF 4:00-4:30; R 9:00-11:50 am

**Instructor:** Bill Gallus, Office: 3025 Agronomy, Phone: 294-2270; email: wgallus@iastate.edu

**Office Hours:** W 1-3

**T.A.:** Mike Klocke-Sullivan, Office: 3029 Agronomy

**Office Hours:** T 11-1; email: klockesm@iastate.edu

**Web Site for additional course support:** http://www.meteor.iastate.edu/classes/mt411

**Portfolio Web Site for Forecasting Contest and messages:** http://www.meteor.iastate.edu/forecast/

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**Course Objectives** In this course, the general characteristics of mid-latitude synoptic weather systems will be explained and compared with the quasi-geostrophic theory of baroclinic development. A thorough understanding of synoptic-scale processes will be emphasized in daily weather briefings given by all students. Students should leave the course able to offer a “reasonable” explanation for any larger-scale weather event that might occur.

**Texts:** “Synoptic Meteorology” Course Notes (required). You may also find your “Severe and Hazardous Weather” books helpful. Other handouts will be distributed when appropriate.

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**Tentative Syllabus**

**A. INTRODUCTION TO WEATHER FORECASTING**


September 2-3: Hurricanes [1-8; Chap 23 of Svr/Hazard]; IN CLASS LAB (CONTEST begins Sept. 2 - handouts)

**B. FUNDAMENTALS OF SYNOPTIC-DYNAMIC METEOROLOGY (Chaps. 6-7 Svr/Hazard Wx Book)**

September 9-10: Kinematics of the wind field: Divergence, Vorticity, and Deformation [9-20].

September 16-17: Balanced flow – geostrophic and gradient wind [21-31].

September 23-24: Thermal wind, Thickness [32-41]; IN CLASS LAB.

**C. QUASI-GEOSTROPHIC THEORY**

Sept. 30 - Oct. 1: Quasi-geostrophic theory; QG Height Tendency Equation [42-64]; IN CLASS LAB.

October 7-8: Quasi-geostrophic Omega Equation [42-64]; IN CLASS LAB.

October 14: REVIEW

**October 15: MIDTERM - (material through Oct. 8)**

D. MISCELLANEOUS SYNOPTIC TOPICS

October 28-29: Fronts, Frontogenesis Equation [74-83; Chap 8 of Svr/Hazard]; IN-CLASS LAB
November 4-5: Baroclinic Development (prediction of surface pressures) [84-88; Chaps 9-10 of Svr/Hazard]; IN-CLASS LAB.
November 11-12: Isentropic Analysis [89-96]; IN-CLASS LAB.
November 18-19: Organization of cloud and precipitation systems [97-99]; IN-CLASS LAB: Case study.
November 25-26: No CLASS - Happy Thanksgiving!
December 2-3: Observing systems and newer theoretical models [100-108]; IN-CLASS LAB.
December 9-10: Long-range Prediction/Ensemble Techniques [109-115], REVIEW
December 14 (2:15-4:15 pm) FINAL EXAM (tentative date)

Grading for MT411/511:

40% Lab exercises (due at the beginning of next lab; late assignments receive one-half credit)
   23% mid-term exam
   27% final exam
   411: 10% Forecast contest, weather briefings, special exercises
   511: 5% Extra lab questions, special exercises, weather briefings(?)
   511: 5% Case Study Project

NOTE ABOUT DISABILITIES: If you have a documented disability and anticipate needing accommodations in this course, please make arrangements to meet with me soon. Please request that a Disability Resources staff send a SAAR form verifying your disability and specifying the accommodation you will need.

NOTE ABOUT ACADEMIC DISHONESTY: In this course, you may be permitted to do some of the weekly lab exercises outside of class. Although I understand it can be helpful to work with others in doing the lab exercises, I caution you to be sure to do your own work. Traditionally, many students receive far worse grades on the exams in this course than on the laboratory exercises, which usually indicates that the students relied too much on others when doing the labs. If I receive lab exercises from two or more students that are basically identical, I will regard it as cheating. All cases of such academic dishonesty will be reported to the Dean of Students. In addition, if problems persist on the lab exercises, I may have to require that they be done in-class.

FINAL THOUGHTS: Although a key goal in this class is that you learn to understand the atmosphere deeply enough to be a good weather forecaster, I hope you also learn to appreciate the complexity and beauty of it, and the orderliness of the laws that govern it. To me, these qualities evidence an amazing Designer, and I hope you, like people through the ages, come to a similar conclusion:

Praise the Lord from the earth
Fire and hail; snow and clouds;
Stormy wind, fulfilling His Word. (from Psalm 148:7-8)