Introduction to Synoptic Meteorology

Meteorology 311 - Fall 2015

Class meetings: Lecture - Monday, 11-11:50am; Lab Tuesday, 2:10-4:00 pm, Lab/Supplemental Lecture - Friday, 11-11:50am.
Location: 3128 Agronomy Hall

Instructor: Mr. Dave Flory
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Teaching Assistant: Amanda Black
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Office hours: TBA, if any.

Text and Course Notes

Introduction to Synoptic Meteorology (Required)
Course notes

Weather Forecasting Redbook, Second Edition (Required)
Tim Vasquez

Web Site: http://www.meteor.iastate.edu/classes/mt311

Student Learning Outcomes

- Learn to obtain, analyze, and interpret weather data from surface, upper air, and satellite data to a degree sufficient to make reasonably accurate forecasts and assist others in their forecasting. This is the primary course in which you are trained in the coding of weather data, and, therefore, several weeks will be spent on this rather tedious, but important subject. More emphasis, however, will be given to the tools used to forecast the weather.
- Develop an understanding of conceptual models of synoptic weather features and apply them to help create a reasonably accurate forecast.
- Develop an understanding of common mathematical methods and apply them to conceptual models of synoptic weather features.

Grading

35% Lab exercises (due the beginning of the next lab; No late labs will be accepted)
5% Forecast contest
30% Mid-term exam
30% Final exam

Disputes with grades on any graded assignment must be resolved with the instructor and TA within one week from the date the assignments are returned. All grades are final after that time.
**Important Dates**

September 7: University Holiday.
November 23-27: Thanksgiving break
December 7: Undergraduate Research Symposium

**Tentative Class Schedule**

**DATA AND ANALYSIS**

Week 1: General principles of synoptic meteorology; terminology; Current organization of ISU weather lab. Exposure to ISU's current weather data software systems (Gempak, Garp, Ntrans, nwx, nsharp, nmap, IDV).
Week 2: Surface and Upper Air data - coding and plotting procedures.
Week 3: Analysis of weather maps; standard procedures for surface and upper air data.
Week 4: Vertical structure of the atmosphere seen via skew-T diagrams.

**CONCEPTUAL MODELS OF SYNOPTIC WEATHER FEATURES**

Week 5: Basic Norwegian cyclone model theory; evolution of systems; tilt of systems (FORECAST CONTEST BEGINS).
Week 6: General circulation; air masses; fronts; jet streams and jet streaks.
Week 7: Synoptic climatology, teleconnections, analogs of specific weather events.
Week 8: Review, MID-TERM (October 13, material through Week 6)
Week 9: Use of satellite and radar data in meteorology

**MATHEMATICAL APPLICATIONS**

Week 10: Important meteorological (Primitive) equations, finite differencing, important variables
Week 11: Numerical Weather Prediction; FOUS and MOS data.
Week 12: Kinematics of the atmosphere - divergence and vorticity; simple related forecasting rules of thumb; vertical motion.
Week 13: Balanced Wind approximations - geostrophic and gradient wind.
Week 14: No class - THANKSGIVING
Week 15: Thickness, Hypsometric Equation, Thermal Wind.
Week 16: Case studies and practical forecasting. REVIEW.
Week 17: Final Exam (Tentative Date: Tuesday, Dec. 15, 9:45-11:45am)

**Academic Misconduct**

Academic Misconduct in any form is in violation of Iowa State University Student Disciplinary Regulations and will not be tolerated. This includes, but is not limited to: copying or sharing answers on tests or assignments, plagiarism, and having someone else do your academic work. Depending on the act, a student could receive an F grade on the test/assignment, F grade for the course, and could be suspended or expelled from the University. See the Conduct Code at [www.dso.iastate.edu/ja/academic/misconduct.html](http://www.dso.iastate.edu/ja/academic/misconduct.html) for more details and a full explanation of the Academic Misconduct policies.
Students with Disabilities

Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. All students requesting accommodations are required to meet with staff in Student Disability Resources (SDR) to establish eligibility. A Student Academic Accommodation Request (SAAR) form will be provided to eligible students. The provision of reasonable accommodations in this course will be arranged after timely delivery of the SAAR form to the instructor. Students are encouraged to deliver completed SAAR forms as early in the semester as possible. SDR, a unit in the Dean of Students Office, is located in room 1076, Student Services Building or online at www.dso.iastate.edu/dr/. Contact SDR by e-mail at disabilityresources@iastate.edu or by phone at 515-294-7220 for additional information.

Dead Week

This class follows the Iowa State University Dead Week policy as noted in section 10.6.4 of the Faculty Handbook http://www.provost.iastate.edu/resources/faculty-handbook.

Harassment and Discrimination

Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact his/her instructor, Student Assistance at 515-294-1020 or email dso-sas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515-294-7612.

Religious Accommodation

If an academic or work requirement conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be in writing, and your instructor or supervisor will review the request. You or your instructor may also seek assistance from the Dean of Students Office or the Office of Equal Opportunity and Compliance.

Contact Information

If you are experiencing, or have experienced, a problem with any of the above issues, email academicissues@iastate.edu.