

**Earth Space and Atmospheric Sciences 1115**  
**Severe and Unusual Weather**  
**Professor Paul L. Sirvatka**  
**College of DuPage**  
**Spring 2012**

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**Description:** In depth study of meteorological phenomena relating to severe thunderstorms, El Niño/Southern Oscillation events, and tropical storms. Topics will include severe weather spotting, weather radar, atmospheric soundings, tornadogenesis, El Niño, tropical meteorology, hurricanes, and an introduction to numerical weather prediction. Basic physical principles, their relation to weather events, and weather's impact on society will also be explored

**Prerequisite:** Math 0481 with a grade of C or better or a qualifying score on the Math Placement Exam or concurrent enrollment in a math course greater than Math 1108.

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Class Notes: <http://weather.cod.edu/sirvatka/1115/>; <http://bb.cod.edu>

**Office Hours:** M 1:00 - 3:00PM; W 2:00 - 3:00PM; F 9:00 - 10:00AM; 2:00 - 3:00PM  
TuTh 2:00-4:00PM  
I will also be available at other times. Please try to set up an appointment if you wish to see me at any time. Please feel free to contact me with questions using email as well.

**Text:** Severe and Hazardous Weather, Rauber, Walsh and Charlevoix, Third Edition, Kendall/Hunt, 2008. ISBN# 978-0-7575-5043-0.

**Additional Materials:** #2 pencils for tests and good colored pencils (at least red, blue, yellow and green) are required *daily*. Calculators may be used during class and you are encouraged to bring one with the sine (sin) function on it. A three-ring notebook is also required to assist in maintaining sufficient organization.

**Attendance:** Attendance is extremely important. Much of the material is covered only in class. It is expected that you will attend all classes. Contact the instructor as soon as possible in the event of an unavoidable absence. Labs and quizzes cannot be made up. Only in exceptional circumstances can tests be given at a time other than the announced date. Exceptions must be pre-arranged. A missed test is a zero.

**Grading:** Labs, quizzes and homework assignments ~ 25%  
Unit exams ~ 75%

Grades will be curved based upon expected results and class participation and attitude. Generally speaking, the grades will be as follows:

A - 84%; B - 73%; C - 62%; D - 50%; F < 50%

All work must be completed. An incomplete will be given only in an exceptional circumstance. It is the student's responsibility to withdraw from the course due to non-attendance. Failure to withdraw will result in an "F". Late assignments will be penalized to a maximum credit of 50% at the discretion of the instructor. Students wishing to take this course on a pass/fail basis must earn a grade of a "C" or higher to receive a "Satisfactory" for the course. In order to fulfill the general education requirements a letter grade must be received.

**Course Objectives:** Upon successful completion of this course the student should be able to do the following:

1. Determine the kinematic flow fields within a thunderstorm
2. Judge the strengths and weaknesses of weather radar
3. Recognize radar patterns indicating a potential for severe weather occurrence
4. Demonstrate proficiency in visual identification of thunderstorm features
5. Identify environments conducive to severe weather formation
6. Plot and interpret an atmospheric sounding on a Stüve diagram
7. Describe the significance of water vapor in thunderstorm development and differentiate between various moisture parameters
8. Summarize indices used in severe weather forecasting
9. Diagnose synoptic-scale conditions favorable for severe weather development
10. Plot and interpret a hodograph
11. Explain the source of rotation in a supercell thunderstorm
12. Summarize the canonical cycle of an El Niño/Southern Oscillation and summarize its effects on global weather patterns
13. Describe the circulation in the tropical atmosphere
14. Explain the evolution of a tropical storm system
15. Compare the atmosphere to a Carnot heat engine
16. Explain the energy cascade
17. Express the basics of numerical weather prediction
18. Explain the role of chaos theory and unpredictability in numerical weather prediction

**Expectations:** The student is expected to attend all classes, participate fully in classroom discussions and cooperate in learning experiences with other classmates. The expected workload is two hours of work for every hour of time spent in class. This will vary from week to week with some weeks having more work required and other weeks having less.

**Final Exam:** A non-cumulative final exam will be given. See <http://www.cod.edu/schedule/> for a listing of the final schedule.

**Advising:** Please feel free to speak to me concerning school plans and classes to take, whether or not you are involved in meteorology as a major. I will be more than happy to discuss anything related to school or anything else in your life that might be a problem or obstacle to your success.