



METR 2603
SEVERE AND UNUSUAL WEATHER
Fall 2013



Instructor: Professor Susan Postawko (spostawk@ou.edu)

Offices: 5923 NWC and 414 SEC

Office Hours: 9:30-10:30 am MW in SEC and 3:30-4:30 pm MW in NWC, or by appointment

Course web pages: We will have two separate web sites for this class.

COURSE MATERIAL: will be available through Next Thought. More information will be given in class.

HOMEWORK ASSIGNMENTS, GRADES & OTHER INFORMATION: will be accessible via Desire2Learn <https://learn.ou.edu> (log on using your 4+4)

Required Materials: *Severe and Hazardous Weather: An introduction to high impact meteorology* (4th edition) by Robert M. Rauber, John Walsh, and Donna Charlevoix.

Course Grade Determination:

4 exams @ 15% each (no drops)	60%
Homework and In-class assignments	40%

- **Final Exam:** Classes that begin at 5:00 PM or later will have the final examination during the last lecture period.

About this course:

Meteorology 2603 is a survey course of the physical processes that are important in the formation of various severe and unusual weather phenomena such as thunderstorms, hail, tornadoes, and lightning, as well as current-events topics such as El Niño, hurricanes and droughts.

It is NOT the aim of the course to make scientists out of all of you; but to help you gain a basic understanding of the atmosphere, and to develop critical thinking skills so that you can read and intelligently discuss newspaper and magazine articles related to weather and climate.

IMPORTANT NOTE: This course will be done primarily as a “flipped” class. That is, you will be expected to go over material in the text and on the web PRIOR to class. You are expected to come to class prepared to discuss the day’s topic and engage in assigned activities that will rely on your having gone over that material.

Exams will be based both on material from the text and web **as well as** material from classroom activities.

When in class, please be considerate of your classmates by turning off cell phones.

If you are having problems with the course material, I strongly urge you to come and talk to me sooner rather than later.

IMPORTANT POLICIES:

Reasonable Accommodation: The University of Oklahoma is committed to providing reasonable accommodation for all students with disabilities. Students with disabilities who require accommodation in this course are requested to speak with me as early in the semester as possible. Students with disabilities **must** be registered with the Office of Disability Services prior to receiving accommodations in this course. The Office of Disability Services is located in Goddard Health Center, Suite 166, phone 325-3852 or TDD only 325-4173.

Academic Misconduct: All provisions of the Norman Campus Academic Misconduct Code shall apply in cases of academic dishonesty. Any violation of the Academic Misconduct Code will result in your removal from this course, and a grade of F will be recorded for the course. Academic misconduct is defined as “any act that improperly affects the evaluation of a student’s academic performance or achievement.” At the University of Oklahoma, academic integrity is expected from each student. Misconduct such as plagiarism, fabrication, and fraud, as well as attempting to commit such acts or assisting others in doing so, will not be tolerated. Students are responsible for knowing the OU Academic Conduct Code, which can be found at <http://www.ou.edu/studentcode> and <http://www.ou.edu/provost/integrity>

TENTATIVE LIST OF TOPICS AND COURSE SCHEDULE

Date	Topic
WEEK 1 Week of August 19	Intro to atmosphere/seasons <ul style="list-style-type: none">• Introduction to the courses and the NWC• Composition of the atmosphere• Pressure structure of the atmosphere• Temperature structure of the atmosphere
WEEK 2 Week of August 26	Intro to atmosphere/seasons (continued) <ul style="list-style-type: none">• Seasons• Atmospheric moisture & clouds Meteorological measurements <ul style="list-style-type: none">• Time: UTC, GMT, and Z• Measuring surface variables
WEEK 3 Week of September 2 (no class on Monday, Sept. 2nd)	Meteorological measurements (continued) <ul style="list-style-type: none">• Rawinsondes and soundings• Radar• Satellites Weather Maps <ul style="list-style-type: none">• Surface station models and weather maps• Upper air maps• Jet streams
WEEK 4 Week of September 9	Forecasting <ul style="list-style-type: none">• Computer models• Numerical weather prediction• Forecast uncertainty Atmospheric stability <ul style="list-style-type: none">• Definition of stability• Lapse rates• Determining stability• Lifting mechanisms

<p>WEEK 5</p> <p>Week of September 16</p>	<p>EXAM 1 – Monday, September 23 (text chapters 1, 2, 3, 4, & 6)</p> <p>Atmospheric forces</p> <ul style="list-style-type: none"> • Gravity • Pressure gradient force • Coriolis effect • Friction • Hydrostatic balance • Geostrophic balance
<p>WEEK 6</p> <p>Week of September 23</p>	<p>Airmasses and fronts</p> <ul style="list-style-type: none"> • Definition of an airmass • Cold fronts • Warm fronts • Stationary fronts • Occluded fronts • Dry lines <p>Mid-latitude cyclones</p> <ul style="list-style-type: none"> • Cyclogenesis in the Great Plains • The mature cyclone • The dissipating cyclone • Cyclone formation elsewhere in the U.S.
<p>WEEK 7</p> <p>Week of September 30</p>	<p>Winter weather</p> <ul style="list-style-type: none"> • Formation of cold airmasses • Wind chill • Snowstorms & blizzards • Freezing rain (a.k.a. “ice storms”) • Winter storm impacts
<p>WEEK 8</p> <p>Week of October 7</p>	<p>EXAM 2 – Monday, October 7 (text chapters 7, 8, 9, 10, 12)</p> <p>Thunderstorms</p> <ul style="list-style-type: none"> • Ordinary (airmass) thunderstorms • Mesoscale Convective Systems • Squall lines • Supercell thunderstorms
<p>WEEK 9</p> <p>Week of October 14</p>	<p>Tornadoes</p> <ul style="list-style-type: none"> • Statistics • Formation • Detection • Forecasting • Safety
<p>WEEK 10</p> <p>Week of October 21</p>	<p>Lightning</p> <ul style="list-style-type: none"> • Charging mechanisms in clouds • Charge distribution • The lightning stroke • Lightning detection • Lightning research <p>Hailstorms</p> <ul style="list-style-type: none"> • Formation • Growth • Detection & forecasting

<p>WEEK 11</p> <p>Week of October 28</p>	<p>Downbursts</p> <ul style="list-style-type: none"> • Downburst formation • Microbursts • Prediction and detection <p>Hurricanes</p> <ul style="list-style-type: none"> • Global distribution of hurricanes • Tropical cyclone formation • Life cycle of tropical cyclones • Statistics • Storm surge • Forecasting <p>EXAM 3 – Wednesday, October 30 (text chapters 18, 19, 20, 21, 22,& 24)</p>
<p>WEEK 12</p> <p>Week of November 4</p>	<p>Floods</p> <ul style="list-style-type: none"> • Types of floods • Flashfloods • Flood forecasting • Flood safety <p>Drought</p> <ul style="list-style-type: none"> • Definitions of drought • Drought indices • Causes of drought • Noteworthy droughts in the U.S. • Droughts around the world
<p>WEEK 13</p> <p>Week of November 11</p>	<p>Heat waves</p> <ul style="list-style-type: none"> • Meteorological conditions associated with heat waves • Effects of heat waves on humans and animals • Effects of heat waves on plants • Urban heat island effect • Memorable heat waves in the U.S. • Heat waves around the world
<p>WEEK 14</p> <p>Week of November 18</p>	<p>El Niño and La Niña</p> <ul style="list-style-type: none"> • Definition of El Niño • The Southern Oscillation • Evolution of an ENSO event • Consequences of and ENSO event in Oklahoma • La Niña definition • Consequences of La Niña in Oklahoma • Forecasting El Niño and La Niña
<p>Week 15</p> <p>Week of November 25</p> <p>(no class on November 27)</p>	<p>Global Climate and Climate Change</p> <ul style="list-style-type: none"> • Controls on climate
<p>WEEK 16</p> <p>Week of December 2</p>	<p>Global Climate and Climate Change</p> <ul style="list-style-type: none"> • Climate change and severe weather <p>EXAM 4 – Wednesday, December 4 (text chapters 5, 23, 25, 26, 27)</p>