

# METR 2603 – Severe and Unusual Weather

## Fall 2014 course syllabus

**Instructor:** Jeff Duda

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**Office:** 5357 NWC (south research campus)

**Office hours:**

4:00-5:00 W – atrium of Sarkeys Energy Center or SEC 410A)

11:00-12:00 R – NWC 5357

**Grader:** James Ulrich

**Required textbook:** Severe & Hazardous Weather: An Introduction to High Impact Meteorology, 4th Ed., by Rauber, Walsh, and Charlevoix

### Course description

Oklahoma, situated along the sloping American Great Plains east of the Rocky Mountains, with a source of warm moist air from the western North Atlantic Ocean including the Gulf of Mexico, a source of hot dry air from the high terrain of northern Mexico and the southwest United States, and a source of cold dry air from the Canadian prairies, is no stranger to extreme weather. In fact, its location amongst the major geographical features of North America make it one of the prime places for certain types of extreme weather, including tornadoes and their parent supercell thunderstorms. While Oklahoma weather may be particularly well known for its frequent and violent (and unfortunately, destructive and occasionally deadly) tornadoes, other types of extreme weather can disrupt life there as well. Land-falling hurricanes and tropical storms can impact the state with high winds and flooding rain. Blistering heat and humidity can endanger the lives of those who remain active during midsummer days. Drought can ruin crops and cause loss of farm and ranch animals, as well as promote wildfires. Blizzards and ice storms can cripple the state, causing power outages and rendering travel impossible.

Because these and other extreme weather hazards can and occasionally do strike Oklahoma (and neighboring states), it is beneficial to possess an understanding of the properties, components, classifications, and underlying causes of these hazards. In this course we will cover these aspects of many of the aforementioned weather hazards, none of which are unique to Oklahoma.

This course covers one aspect of the field of meteorology – severe and unusual weather. The University of Oklahoma's School of Meteorology does offer an additional class for non-meteorology majors – METR 1014 – Introduction to Weather and Climate. However, Severe and Unusual Weather is not meant to supplement or complement the material covered in Introduction to Weather and Climate. Therefore, any students who have taken METR 1014 will probably notice some overlapping of material, particularly in the first half of the semester. While it is absolutely necessary to cover the fundamentals of meteorology for those students who have not taken METR 1014, especially since it provides a deeper and clearer understanding of the causes of the hazardous weather that will be covered in this class, even students who took METR 1014 may find the way the material is presented in this class beneficial to their understanding of the overlapped topics since each instructor presents and explains the material differently.

While this class is meant to serve as a general education natural science elective for non-majors, it is still a science class at its core. Therefore, scientific principles and modes of thought, as well as some light mathematics, are unavoidable. We will take it slow with the math, but expect to be asked to perform some simple calculations from time to time. Creativity and critical thinking are also encouraged. I encourage you not to simply copy every word on every slide or every word that comes from my mouth so you can regurgitate it on an assignment or exam, but to embellish your notes with your own paraphrasing of the notes on the lecture slides. Draw your own pictures to explain topics. Draw flow charts if they help you. Use flash cards if they help. Perform sanity checks, otherwise known as the smell test: if something doesn't make logical sense according to your bank of knowledge, question me or whoever else may be presenting. Never be afraid to ask questions if you don't get it or need clarification. Asking questions is probably the most effective way of obtaining knowledge directly from a source. I hope you soak up as much factual information as possible and come out of the class with a second-nature instinct on how to identify, observe, classify, and analyze the weather hazards we will cover. And I hope I'm able to make the journey fun and memorable as well.

### **Tentative schedule and list of topics**

Since I am teaching this course for the first time I simply don't know how long it will take to get through each topic, and therefore I don't know if we will have time to get through the following list of topics. I will not try to rush through any material if there are many topics left as the semester draws to a close. Rather, those topics will simply not be covered, and the scope of the following exam will be adjusted accordingly.

*Planned absence:* I will be out of town during the first week of November. I will either find a guest lecturer that week or will give you an assignment that you can work on outside of class.

#### *Unit 1: Introduction to meteorology and basic processes*

- Introduction to the atmosphere
- Measuring/observing the weather
- Displaying and mapping weather observations
- Fundamental laws of physics that govern the motion of the atmosphere
- Development of high and low pressure systems
- Fronts and air masses
- Unit 1 exam (tentative: early October)

#### *Unit 2: Severe convective weather*

- Atmospheric stability
- Thunderstorms
- Tornadoes
- Severe straight line winds
- Hail
- Lightning
- Heavy rain and flash flooding
- Unit 2 exam (tentative: early-mid November)

#### *Unit 3: Other hazardous weather that can impact Oklahoma*

- Tropical storms/hurricanes

- Heat waves & droughts
- Cold outbreaks and blizzards
- Ice storms
- Unit 3 exam/final exam (Finals week: comprehensive)

**Grading** (weights subject to change)

Unit 1 and 2 exams: 15% each

Unit 3/Final Exam: 20%

Written assignments (approximately 12-15): 40%

Severe weather and climate change paper: 10%

**Academic Misconduct Policy**

Academic misconduct is defined as any act which improperly affects the evaluation of a student's academic performance or achievement. It specifically includes *cheating, plagiarism, fabrication, fraud, destruction of property, and bribery or intimidation, as well as assisting others or attempting to engage in such acts*. While communication and collaboration with your classmates as well as others who may not be taking the course regarding assignment material is acceptable and even encouraged (to improve one's own understanding of the subject), any and all writing submitted for an assignment must be written in your own words, and any direct quotations from any sources must be cited and credited appropriately. "Overquoting" (constructing the majority of text of a writing assignment from direct quotes) is considered academic misconduct. The Academic Misconduct Code is printed with the Student Code and is available at <http://integrity.ou.edu>.

**Reasonable Accommodation Policy**

Any student in this course who has a disability that may prevent him or her from fully demonstrating his or her abilities should contact me personally as soon as possible so we can discuss accommodations necessary to ensure full participation and facilitate your educational opportunities.