

METR 2603H Severe and Unusual Weather

Fall 2011

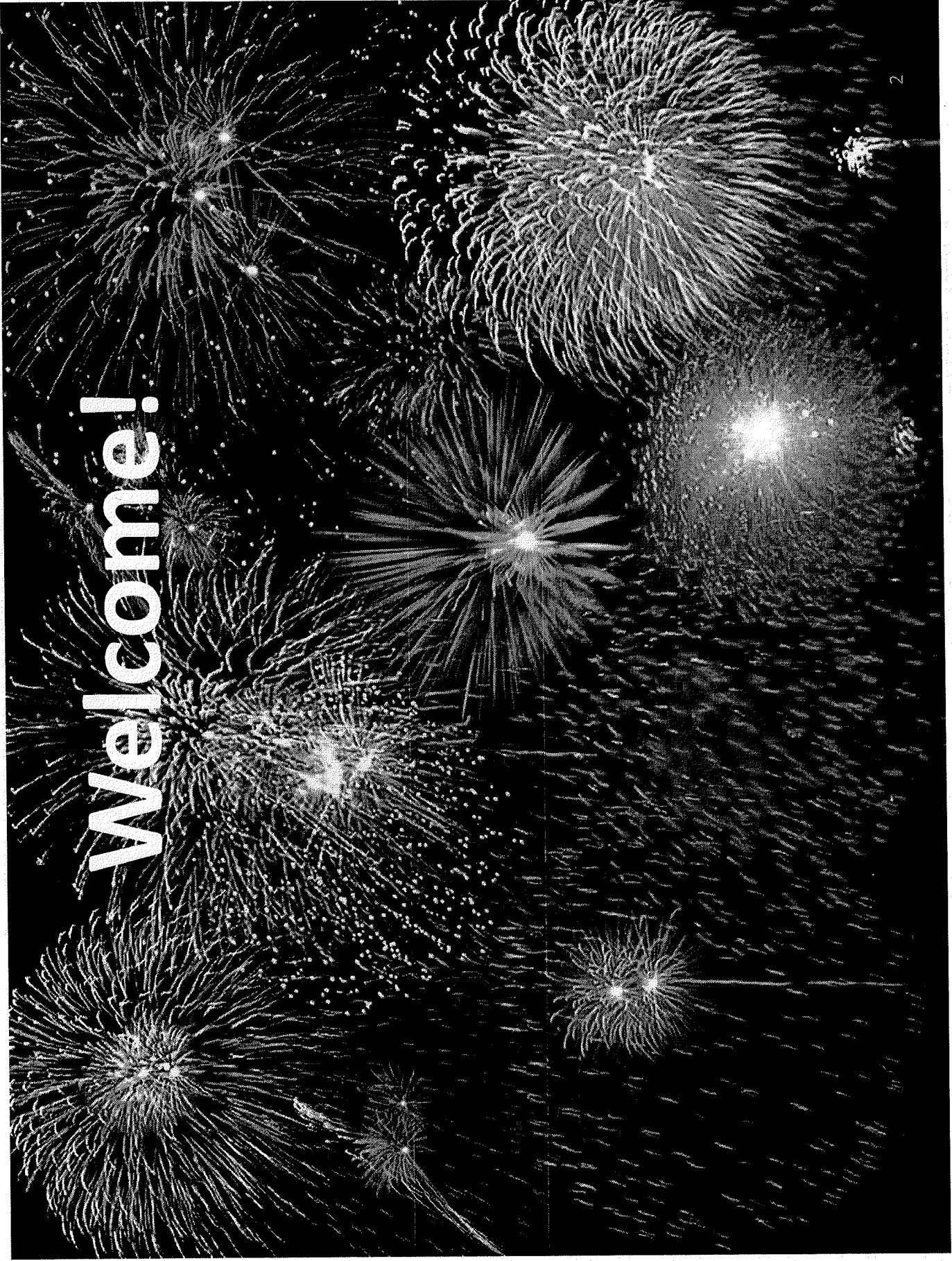
Monday/Wednesday/Friday, 9:00 AM, NWC 5930

Lecture 1

Welcome, Introductions, And Course Orientation

Most recent posting: Sunday, 19 August 2012

Welcome!



Opening Remarks

- **Introductions**
 - A bit about me
 - Introduce Yourself
- **Course Orientation**
 - Motivation for This Course
 - What is This Course About?
 - Supporting Course Materials
 - Tentative Course Schedule for Fall 2011 Semester
 - Tentative Grading Scheme
 - Weekly Review Papers
 - Short Papers
 - My Schedule

- **Course Administration, continued**
 - Relevant and Applicable University Policies
 - My Policies
 - Expected Professional Conduct
 - Course Survival Skills

Introductions

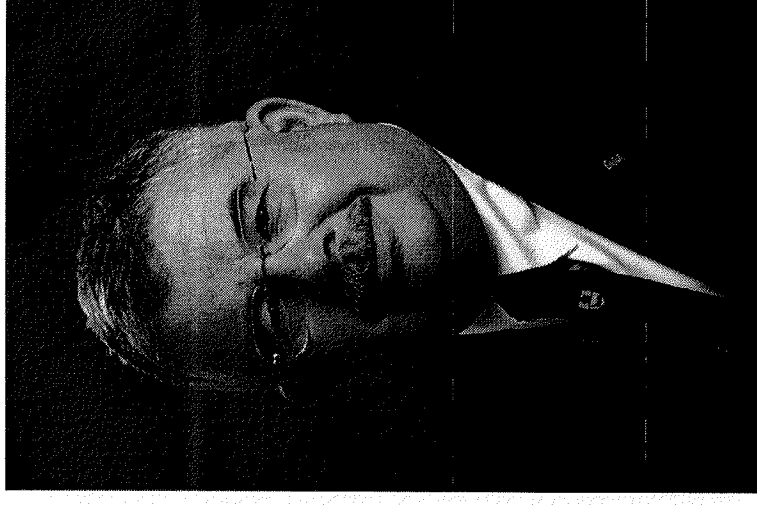
A bit about me

Instructor: John T. Snow; Room NWC 5710, National Weather Center; 325-1174, jsnow@ou.edu

John T. Snow is a Regents' Professor of Meteorology and dean emeritus of the College of Atmospheric and Geographic Sciences. He came to OU in 1994 from Purdue University, where he had been a faculty member in the Department of Earth and Atmospheric Sciences since 1977. Snow received his bachelor's degree in electrical engineering from Rose-Hulman Institute of Technology (then named the Rose Polytechnic Institute) in 1968, his master's degree in 1969 from Rose, and his doctoral degree in atmospheric science from Purdue in 1977. In 1997, he received Purdue's Distinguished Alumni Award from the Purdue's School of Science.

He has held teaching and research positions in France, is a Fellow of both the American and Royal Meteorological Societies, and is a member of the American Society of Testing and Materials. Snow has been a member of the National Oceanic and Atmospheric Administration's Science Advisory Board and the Board of Directors of the University Corporation for Atmospheric Research. He currently serves on the NRC Board on Atmospheric Science and Climate and the NSF Geosciences Advisory Board. He has received the Charles Anderson Award (for education and promotion of diversity) and the Charles Franklin Brooks Award for outstanding service from the American Meteorological Society. He is a retired lieutenant colonel (U.S. Army). During the Gulf War 1990-91, he was stationed in Dhahran, Saudi Arabia, and was awarded the Bronze Star for his service.

Dr. Snow enjoys traveling, is an unabashed Francophile, and is an avid collector of books and ephemera dealing with the American experience in World War I.



Introduce Yourself

- Go around the room
 - Who are you?
 - Where are you from?
 - What is your major?
 - Why are you here?
 - What do you want to get out of this course?

Course Orientation

Motivation for this Course

As weather-related catastrophes of the last few years testify, weather and climate are becoming ever more important considerations in the functioning of our civilization. Globally, populations are expanding and developing expectations for a higher quality of life. As a consequence, civilization is requiring ever more resources from nature. Civilization is also becoming more vulnerable to high impact weather and climate events that disrupt the normal functioning of its ever-more complex infrastructure.

When in the future you serve as leaders of our society, you will inevitably be called upon to make many decisions about events that are influenced by weather and climate. To make wise decisions in these situations, you will need an appreciation for the science behind weather and climate phenomena, particularly those that have potential for high impact on civilization, how society has dealt with such events in the past, and what the future likely holds.

What Is This Course About?

This course is intended to help you develop knowledge and understanding about hazardous weather and climate phenomena that have potential to impact society.

The course will provide you a description of the physical processes important in the formation of severe and unusual weather phenomena including: severe thunderstorms, which produce heavy rain, hail, lightning, strong winds and tornadoes; tropical cyclones (in their most intense form, hurricanes) that produce very heavy rains and storm surge; winter storms, including ones with heavy rains on the West Coast, and others with intense cold, heavy snow, and high winds across the central and eastern US; lake effect snows; wildland fire; and environmental/climate variability and long-term changes, which can include changes in weather patterns on local, regional, and global scales, giving us el Nino/la Nina, teleconnections, monsoons, droughts, and heat waves.

While weather and climate are inherently global, we will focus primarily on events that impact North America and the United States to make our discussions concrete and close to home.

Supporting Course Materials

- **Textbook:** *Severe & Hazardous Weather*, 4th Edition, by Robert M. Rauber, John E. Walsh, and Donna J. Charlevoix – we will use this book as a primary source throughout the course. We will cover a lot of this material in Module 1 (first six weeks)
- **Assigned books to be read:**
 - *Deadly Season: Analysis of the 2011 Tornado Outbreaks*, Kevin M. Simmons and Daniel Sutter We will discuss this book in Module 2, together a series of articles and discussion extracted from the NYT “Dot Earth” blog by Andrew Revkin on this same topic.
 - *The Perfect Storm – A true story of men against the sea*, by Sebastian Junger. We will use this book as an example of “how bad can it get” with East Coast weather. For George Clooney fans, we also will watch segments of the movie of the same name to see how well key phenomena are represented to the public.

- *The Worst Hard Time*, by Timothy Egan – probably the best popular book available on the dirty ‘30s. Will help us understand not only the weather of that time, but also its impact on the people.
- **Course Notes** (see comments on Notes page for this slide)
 - **Presentation Slides**
 - **Illustrative Examples**
 - **Hidden Slides**
 - **Accompanying Notes Page(s)**
 - **Questions, Problems, Reading Assignments**

Course Organization

- Three one-hour* class meetings per week
- For each class meeting, there will be assigned readings. See D2L for the PowerPoint slide deck for each class meeting; normally the second slide in the deck will contain the readings for that class meeting. **You are expected to read the assigned material in advance of the class meeting.**
- The course is divided into **four modules**
 - **First six weeks** – back ground material; a general overview of relevant meteorology and climate topics. During this period, I will lecture for the first 30 minutes of each class, then either address your questions from the readings and the lecture, or if you do not have questions, I will ask you some.
 - **Three three-week modules**, each dealing with a special topic of interest: severe thunderstorms; hurricanes; and regional scale climate variability, emphasizing the “dirty ‘30s”.

Desire To Learn = D2L

learn.ou.edu

We will make extensive use of D2L in this course. You should work to become very familiar with this on-line courseware as you will use it throughout your time at OU.

All my notes, announcements, and e-mail to the class will be through D2L. You will also submit a large percentage of your assignments through the D2L Dropbox.

So, bottom line, learn well how to use D2L.

Tentative Course Schedule

The Course Schedule is provided as Lecture L1a. It is your responsibility to read the schedule and do the readings and other work assigned there.

Since this is only the second offering of this course, **the course schedule is still somewhat tentative and subject to change.** I will be adjusting the course schedule throughout the semester to reflect how the course actually progresses. While I will try to announce all schedule changes in class and on the D2L website, **it is your responsibility to be aware of any and all posted changes.** This means that you will need to consult the Course Schedule at least once per week to keep up with changes.

Tentative Grading Scheme

- Class participation: 10% (subjectively awarded by me)
- Weekly review papers: 15%
- Three short papers/posters/presentations: 15% each = 45% of course grade
- Mid-term (~at the end of the first six weeks): 10%
- Final (end-of-course): 10%

It is **likely** that grades will be assigned based on the following cutoffs: A \geq 90.000%, B = 80-89%, C = 70-79%, D = 60-69%, F = <60%. An **average performance** in this class will receive a **satisfactory grade (C)**.

There are no opportunities to earn extra credit in this class.

Weekly Review Papers

At the end of each week of instruction, you are to prepare a short review of the week that addresses the following question:

What three new things did I learn this week in this class?

These Weekly Review Papers are to be short (no more than one page) and will most likely consist of three paragraphs, one paragraph per “new thing”. If a figure or two are used, then the paper can extend to two pages, but in no case should the total length of text exceed amount equal to one full page.

These Weekly Review Papers are due in the D2L Dropbox not later than start of class the following Monday. I will try very hard to turn these around by the following class meeting.

The Weekly Review Papers will be graded on both content and quality of writing. The goal is for you to communicate clearly and effectively but also succinctly.

Short Papers/Posters/Presentations

In addition to reading assignments in the textbook, you are to read one book and some supplemental materials for each of the three three-week modules.

There will be an activity associated with the readings assigned for each of the three three-week modules. These may involve short papers/posters/presentations. The activities will be assigned in the first week and due on the Wednesday of the third week of each module. On the last day or two of each module, I will ask a few students to discuss their activity with the class and respond to questions. I will make every effort to ensure that each student gets at least one opportunity to do this.

My Schedule

My position within the University requires me to travel a good deal on official business. I also have a few personal matters that necessitate my missing a couple of class meetings. When I am absent, I will have ...

- ... a substitute faculty or staff member stand in for, and/or

- ... an e-mail discussion with you on the topic for the day I miss. Such discussions may necessitate your meeting/working in small groups during the scheduled class meeting time.

Course Administration

Relevant and Applicable University Policies

The University has many policies and procedures that guide the educational process. See [L1b Honoring our Commitment](#) for details.

The Provost has asked that I especially call to your attention the following policies:

- [L1c Reasonable Accommodation Policy 2012](#) and [L1d Religious Services Policy 2012](#) for more information about relevant and applicable university policies regarding the educational process.

You should also be read and understand the following:

- General expectations of student behavior: <http://studentconduct.ou.edu/>
- Expectations for student integrity: <http://integrity.ou.edu/>; see in particular [A Student's Guide to Academic Integrity](#)
- The Provost has asked that I include the following statement here: *"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."* Here "me" = me (JTS).

- Students should pay special attention to the expectations discussed in the Student Handbook and the University Catalog. **Bottom line: Cheating, plagiarism, and other forms of academic dishonesty will not be tolerated in this course and so will be handled accordingly.**
 - As commonly defined, plagiarism consists of passing off as one's own ideas, words, writings, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you have the permission of that person.
 - If you desire to cite or quote the work of another, use the citation format required by the American Meteorological Society.

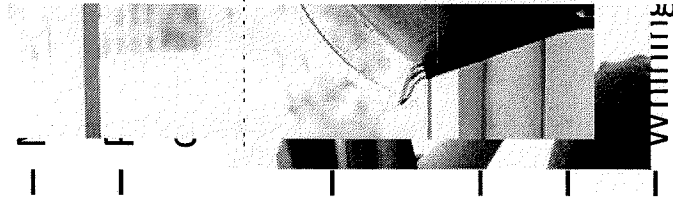
My Policies

- **You are a young professional and I will treat you as such. In return, I expect the highest level of professional conduct in this course.** Among other things, this means that you are expected to contribute to the maintenance of an environment appropriate for learning, one that considers and respects the needs and rights of others. Professional conduct includes integrity in your work and a tight focus on the task on at hand.
- The course schedule is tentative and subject to change.
 - All changes will be announced in advance on the website and in class. **It is your responsibility to be aware of any changes.**
 - Read the material assigned for each class. Prepare questions and be ready to discuss.
- Unless arrangements are made ahead of the deadline, material to be turned in for grading will not be accepted after the deadline. Here “arrangements” means either ill (a doctor’s note is required) or on official university travel.
- Students who do not hand in materials by the due date may receive a grade of zero on that assignment.

- **The materials used in this course contain copyrighted materials, included here under “fair use” of such materials for instructional purposes. In addition, the course materials as a whole are copyrighted. These materials include but are not limited to syllabi, power point slides/notes pages, quizzes, exams, lab problems, in-class materials, review sheets, and additional problem sets. These materials are provided for your use in this course. You may keep one set for study and personal reference. You do not have the right to further distribute these materials unless permission is expressly granted in writing by me.**

Expected Professional Conduct

- No ...



in the
case

while in

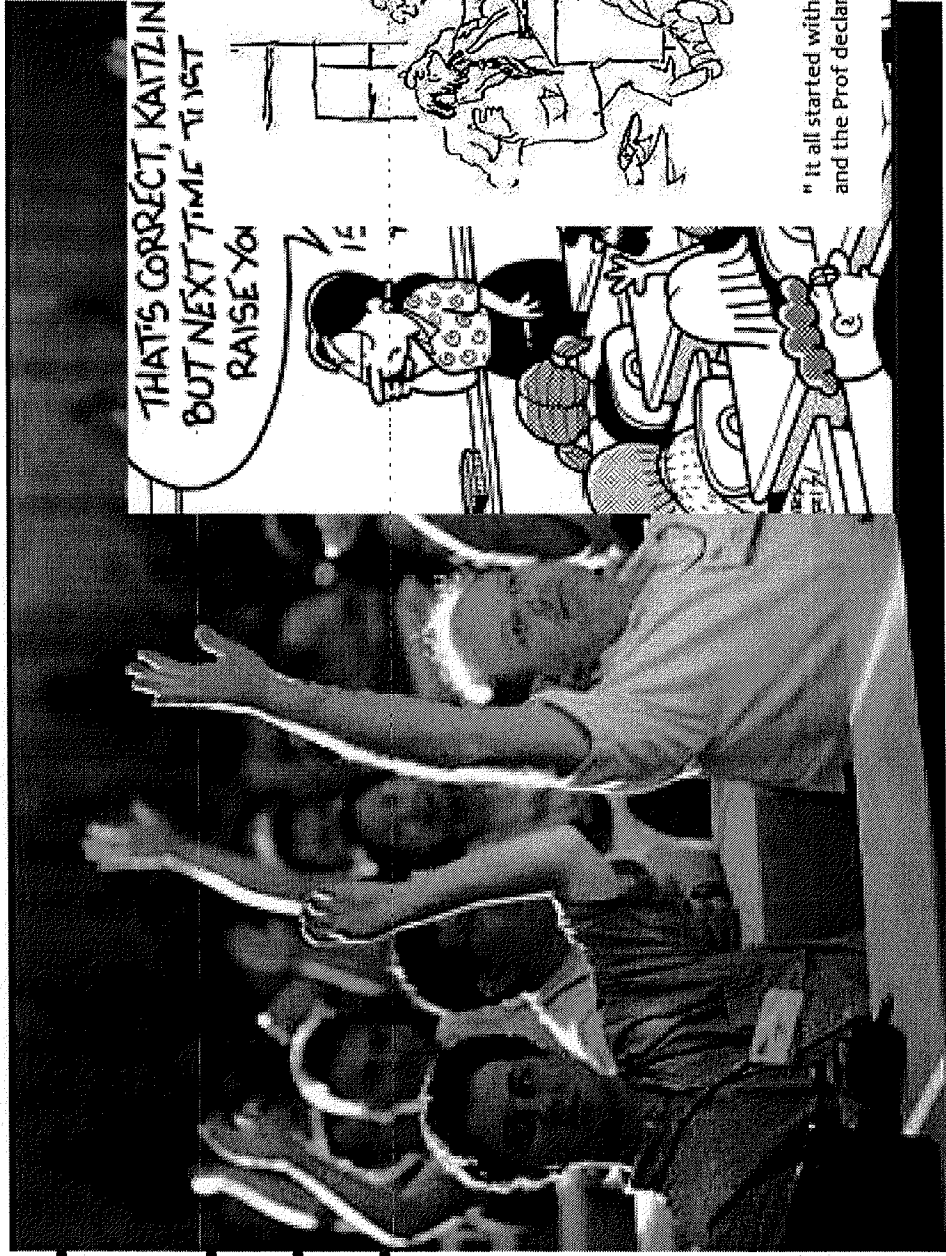
"How can I possibly be a discipline
problem? I'm usually asleep."

Expected Professional Conduct



Expected Professional Conduct

- Class participation is important, expected, and will be noted. * * *



to start and stop

" It all started with the analysis of a simple Case Study and the Prof declared that there were points for CP"

Course Survival Skills

- If you need help, ask
 - Office hours: right after class or by appointment; call or e-mail for an appointment
- Attending class is important. Coming to class, paying attention, participating, and taking notes is perhaps the best way to learn the course material.
- Read the assigned materials
- Flying solo is hard -- in this course (or in life, for that matter) → teamwork, group study, etc... are very helpful ways to learn
- In your written materials, remember that everyone communicates, but few connect effectively → **short, pointed papers are much preferred** (and will result in a better grade)

METR 2603H Severe and Unusual Weather

Fall 2012

Monday/Wednesday/Friday, 9:00 AM, NWC 5930

Lecture 1a

Course Schedule

Most recent posting: Monday, 3 September 2012

Week 1: Module 1 – The Basics of Weather and Climate

M 20 Aug - L1: Welcome and Course Orientation

L1a: Course Schedule

L1b: Honoring Our Commitment – policy summary from the Provost

L1c: Reasonable Accommodation Policy

L1d: Religious Services Policy

W 22 Aug -- L2: Module 1 - The Basics of Weather and Climate

– L2a: INSOLATION – FIR – Energy Balance

F 24 Aug – L3: Composition, Temperature and Pressure, and Vertical Structure Of the Atmosphere

L3a: Weekly Review Paper - sample

Week 2: Module 1 – The Basics of Weather and Climate

M 27 Aug – L4: Water in the Atmosphere

W 29 Aug – L5: Air Parcels and Lapse Rates

F 31 Aug – L6: Clouds and Precipitation

After this lecture, read through the following on your own:

L6a: A Cloud Menagerie

L6b: Satellite Observations of Clouds

Write a paragraph on what you learned from reading L6a; do similarly for L6b. The two paragraphs together should be no more than one page of text. These are due in the D2L Dropbox before 9 AM on Tuesday, 4 September.

Week 3: Module 1 – The Basics of Weather and Climate

M 3 Sep – Labor Day: Holiday/no class

W 5 Sep – L7: **Air Masses and Fronts** (JTS away but will be available by phone and e-mail during the regular class time)

F 7 Sep – L8: **The Winds 1**

Week 4 : Module 1 – The Basics of Weather and Climate

M 10 Sep – L9: The Winds 2

W 12 Sep – L10: The General Circulation of the Atmosphere; Ridges and Troughs

F 14 Sep – L11: Jet Streams and Streaks

Week 5: Module 1 – The Basics of Weather and Climate

M 17 Sep – L12: Local and Regional winds

W 19 Sep – L13: Upslope and Downslope Winds

F 21 Sep – L14: Surface Pressure Systems

Week 6: Module 1 – The Basics of Weather and Climate

M 24 Sep – L15: Named Cyclones

W 26 Sep – L16: Monsoons

F 28 Sep – L17: Winter Weather

L17a: Lake Effect Snows

L17b: Ice Storms

Right after today's class, I will post to D2L the following:

L17c: Exam over Module 1 – The Basics – take home; turn in via the D2L

Dropbox before 5 PM on 5 Oct 12

Week 7: Module 2 – Severe Thunderstorms 1

M 1 Oct -- L18: Module 2 - Deep Convection in the Atmosphere

L18a: Stability and instability; convection 1

Reading assignments and instructions for the Research Paper are to be found in L18b, L18c, and L18d

W 3 Oct – L19: Stability and instability; convection 2

F 5 Oct – L20: Deep convection in the atmosphere 1 -- severe thunderstorms; squall lines; MCCs, etc...

Exam over Module 1 – The Basics: Due! – turn in via the D2L Dropbox before
5 PM this day

Week 8: Module 2 – Severe Thunderstorms 2

M 8 Oct – L21: Deep convection in the atmosphere 2

Before 5 PM this day, turn in via the D2L Dropbox the topic that you have selected for your paper. Include a brief discussion of why you selected this topic over the others on your list, and a brief discussion on how you plan to proceed to further research your selected topic.

First draft of your Research Paper due not later than 5 PM on Monday 15 Oct

12. Final copy of your Research Paper due not later than 5 PM on Friday 26 Oct 12.

W 10 Oct – L22: Tornadoes – formation, climatology, and impacts

F 12 Oct – OU/Texas Break: Holiday/No Class

Week 9: Module 2 – Severe Thunderstorms 3

M 15 Oct – L23: In-class discussion of *Deadly Season: Analysis of the 2011 Tornado Outbreaks* by Kevin M. Simmons and Daniel Sutter

First draft of your Research Paper due not later than 5 PM on this day. Turn in via the D2L Dropbox.

W 17 Oct – L24: In-class discussion of “Dot Earth” articles by Revkin

F 19 Oct – L25 : Discussion of research papers

We will begin at 8:30 AM this day. Coffee and donuts provided

Final copy of your Research Paper due not later than 5 PM on Friday 26 Oct 12. Turn in via the D2L Dropbox.

Week 10: Module 2 – Hurricanes and Atlantic Storms 1

M 22 Oct – L26: **Tour WFO, SPC, and HWT.** Before the tour, read L26a

Meet at 9 AM in the NWC Atrium

L26b: **Module 3 – Hurricanes and Atlantic Storms.**

Begin reading *The Perfect Storm* by Sebastian Junger

W 24 Oct – L27: **Tropical Cyclones 1 – Characteristics and General Properties;
Climatology for the North Atlantic**

F 26 Oct – L28: **Tropical Cyclones 2 – – Structure, Formation, and Forecasting**

Final copy of your Research Paper due not later than 5 PM this day. Turn
in via the D2L Dropbox.

Week 11: Module 3 – Hurricanes and Atlantic Storms 2

**M 29 Oct – L29: Tropical Cyclones 3 - Forecasting, continued; Watches and Warnings;
Naming Conventions; Dangers**

W 31 Oct – L30: Nor’ Easters and “Bombs” 1

F 2 Nov – L31: Nor’ Easters and “Bombs” 2

Week 12: Module 3 – Hurricanes and Atlantic Storms 3

M 5 Nov – L32: XXXXXXXXXXXXXXXXX

First draft of your review of *The Perfect Storm* due not later than 5 PM this day. Turn in via the D2L Dropbox.

W 7 Nov – L33: Watch the extracts of the movie “*The Perfect Storm*” followed by in-class discussion of the video

We will begin at 8:30 AM this day. Coffee and donuts provided.

F 9 Nov – L34: In-class discussion of *The Perfect Storm* by Sebastian Junger

Week 13: Module 4 -- Regional Scale Climate Change 1

M 12 Nov – L35: Module 4 – Regional Scale Climate Change

L35a: High Impact Weather in a Changing Climate

Poster project instructions are in L36b, L36c, L36d, and L36e

Begin reading The Worst Hard Time: The Untold Story of Those Who Survived the Great American Dust Bowl, by Timothy Egan.

W 14 Nov – L36: The Dust Bowl of the 1930s

L36a: Drought; Dust and Sand Storms Quantifying drought - the Crop Moisture Index and the Palmer Drought Index (PDI)

F 16 Nov – L37: Causes and Effects: Southern Oscillation/el Nino + la Nina

Read the reviews on Amazon.com of the video “Surviving the Dust Bowl”; make a list of good and bad points about this video for discussion on 19 November

Final draft of your review of “*The Perfect Storm*” due not later than 5 PM this day. Turn in via the D2L Dropbox.

Week 14: Module 4 – Regional Scale Climate Change 2

M 19 Nov – L38: Watch the video “American Experience: Surviving the Dust Bowl” followed by in-class discussion of the video

L38a: Customer Reviews of the DVD

We will begin at 8:30 AM this day. Coffee and donuts provided.

W 21 Nov – Thanksgiving break: Holiday/no class

F 23 Nov – Thanksgiving break: Holiday/no class

Week 15: Module 4 – Regional Scale Climate 3

M 26 Nov – L39: “... and now the rest of the story!”

-- Poster topic due by 5 PM this day. Turn in via the D2L Dropbox.

W 28 Nov – L40: **In-class discussion of The Worst Hard Time**. Please complete your reading of this book and related materials by this class meeting.

F 30 Nov – L41: **No Class Today – Work on Posters** (JTS in San Francisco)

L41a: **Final Examination** – take home; **due not later than 10:00 AM, 10 Dec**

12

By 5 PM this day turn in via the D2L Dropbox a first draft of your poster

Week 16: Last Week of Classes/Module 4 – Regional Scale Climate Change 4

M 3 Dec – L42: Reflections on the Dust Bowl – Gary McManus, guest lecturer (JTS in San Francisco)

W 5 Dec – L43: Managing Drought in Oklahoma – Mark Shafer, guest lecturer (JTS in San Francisco)

-- Your completed poster due not later than 5 PM this day. Turn the full size paper copy in to Becky Steely in the School of Meteorology Office. Send an electronic copy to the D2L Dropbox.

F 7 Dec – L44: Presentation and Discussion of Posters

We will begin at 8:30 AM this day in NWC 5720. Coffee and donuts provided.

Week 17: Final Examination Week 1

M 10 Dec, 8 AM to 10 AM – **Scheduled final exam period.**

- Final examination due not later than 10 AM this day.
Deposit your completed final exam in the D2L Dropbox.