Atm Sci 109 (Online): Thunderstorms, Tornadoes, and Hurricanes  
Summer 2018

Instructor: Prof. Sergey Kravtsov

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Office Hours: N/A

Please feel free to contact me using my kravtsov@uwm.edu email. I will try to respond to any emails ASAP, in most cases — nearly immediately — except when traveling and/or without internet access.

Course Prerequisites: None

Course Description:  
Atm Sci 109 is an introductory level course which discusses phenomenology and dynamics of various severe weather phenomena, including tornados and hurricanes. It is a one-term course for prospective elementary school teachers and/or students majoring in business, engineering, the life and social sciences, and the liberal arts. The course provides a brief introduction to the composition, structure, energetics, and circulation of the atmosphere, as well as to the analysis of weather systems. This is followed by an in-depth examination into the physical principles and phenomenology of severe weather events. The course introduces the scientific method and emphasizes the importance of meteorology in the modern world.

There are fifteen modules for the course, each followed by a quiz. Students may take each quiz up to three times. After each attempt, you will be able to see what answers were correct and incorrect, but please note that the questions in each quiz are selected randomly from a large bank of questions. It is therefore unlikely you will have the same questions with each attempt. The highest attempt of the three will be the one that counts toward your final course grade. Each quiz is worth 6% of your final grade. All quizzes are open at the beginning of the semester. They close on a rolling basis: the first quiz closes at 11:59 pm CT on Sunday, June 3rd, the second quiz closes at 11:59 pm CT on Sunday, June 10th, and so on up to quiz 11, which closes on Sunday, August 12th. Quizzes 12–15 all close on Saturday, August 18th, at 11:59 pm CT (see due dates schedule below). Quizzes are unavailable after the time at which they close, with no exceptions except in the instance of D2L outages in the six hours prior to quiz closure, although all course modules remain active throughout the semester.

This course also includes a final report, due in the dropbox on D2L by 11:59 pm CT Saturday, August 18th. While the precise report format is left to the student, you may wish to consider conducting a case study analysis of a previous hurricane season or severe weather event. In essence, anything that applies what you learn in this course to actual high-impact weather is an appropriate report topic. If you are unsure of whether your desired report topic is appropriate, please ask the instructor well in advance of the due date!

The final report should be from two to four single-spaced pages in length (12-pt font, 1” margins), including figures. References should be cited where appropriate and do not count toward report length. The submitted copy of your report needs to be in PDF format. If your report contains material copied, verbatim or otherwise, from elsewhere without appropriate attribution, you will receive a 0% on the report and receive a further one full grade letter deduction from your final grade. Plagiarism is not acceptable, and students are directed to the “Academic Misconduct” section of this syllabus for more details.
Grading: Module Quizzes 90%, Final Report 10%

Grading Scale:
A 90.00-100%    A- 86.50-89.99%    B+ 83.00-86.49%    B 76.00-82.99%
B- 72.50-75.99% C+ 69.00-72.49%    C 65.00-68.99%    D 60.00-64.99%
F 0-59.99%

Module summaries:
1. Composition and mean structure of the atmosphere; relevant variables to measure the atmosphere
2. Energy transfer, diurnal and annual cycles
3. Water in the atmosphere, cloud and precipitation formation
4. Winds and their cause
5. Air masses, fronts, cyclones, mesoscale processes, and a peek at severe weather
6. Weather map reading – interpreting and understanding weather on continental and smaller scales
7. Remote sensing and precipitation estimates
8. Convection I: Buoyancy and Convective Available Potential Energy
9. Convection II: Shear and Convective Storms
10. Mesoscale Convective Systems
11. Supercell Thunderstorms and Tornadoes
12. Lightning and Thunder
13. Tornadoes
14. Hurricanes
15. Severe Weather Safety

Attendance: This course is largely self-paced! Time spent working on the material will not be part of the grading. However, I will monitor your progress and will provide a friendly e-mail reminder if I feel you are not making progress consistent with completing the course by the end of the term.

Time Investment:
The amount of time that an average student should expect to spend on this class is as follows:

Time spent studying modules: 60 hours
Time spent exploring supplemental material: 30 hours
Time spent completing quizzes: 15 hours (1 hour per module)
Time spent commenting on and reading discussion boards: 15 hours
Time spent completing the final report: 24 hours
Total time spent on this class: 144 hours

Text: None required. If you would like more background (particularly for the first four modules), a good text is Meteorology: Understanding the Atmosphere (4th Edition) by S. Ackerman and J. Knox. This is a standard text that is used in many introductory meteorology courses, including here at UWM. Used editions of this text are inexpensive online. Divine Wind by Kerry Emanuel provides an up-to-date, easily accessible read on hurricanes, and is a good choice for those who want to go beyond the course material.
General Education Requirement Documentation

This course carries Natural Sciences General Education Requirement designation. Thus, upon successful completion of this course, you will at a minimum be able to (1) understand and apply major concepts of a natural science discipline, including its breadth and its relationship to other disciplines and (2) explain and illustrate the relationships between experiments, models, theories and laws. In so doing, this class addresses University of Wisconsin System Shared Learning Goal #5, “Individual, Social, and Environmental Responsibility including civic knowledge and engagement (both local and global), ethical reasoning, and action.” Your performance on course module quizzes and the final report will be used to assess these criteria and goals.

Disability: Students with special needs have access to educational opportunities equal to those of non-special need students. To insure that reasonable accommodations can be made for students with special needs each student must identify him or herself in a timely manner, preferably prior to the beginning of a term. However, if students are unsure of eligibility to receive accommodations and have not discussed this with a university representative, students should discuss these concerns with their instructor or advisor as early as possible.

Religious Observances: Students will be allowed to complete examinations or other requirements that are missed because of a religious observance.

Academic Misconduct: The University has a responsibility to promote academic honesty and integrity and to develop procedures to deal effectively with instances of academic dishonesty. Students are responsible for the honest completion of and representation of their work, for the appropriate citation of sources, and for respect of others’ academic endeavors. Further information may be found at: http://uwm.edu/academicaffairs/facultystaff/policies/academic-misconduct/

Complaint Procedures: Students may direct complaints to the Atmospheric Science Program Coordinator (Prof. Clark Evans, EMS W401, evans36@uwm.edu) or chair of the Department of Mathematical Sciences (Prof. Bruce Wade, EMS E402, wade@uwm.edu). If the complaint allegedly violates a stated university policy, it may be directed to the head of the department or academic unit in which the complaint occurred or to the appropriate university office responsible for enforcing the policy.

Grade Appeals: A student may appeal a grade on the grounds that it is based on a capricious or arbitrary decision of the course instructor. Such an appeal shall follow the established procedures adopted by the department, college, or school in which the course resides. These procedures are available in writing from the department chairperson or Academic Dean.

Sexual Harassment: Sexual harassment is reprehensible and will not be tolerated by the University. It subverts the mission of the University and threatens the careers, educational experience, and well-being of students, faculty, and staff. The University will not tolerate behavior between or among members of the University community that creates an unacceptable working environment. Further information can be found at: https://www4.uwm.edu/secu/docs/other/S_47.pdf
Important Dates:
Tuesday, May 30th                  Instruction begins
Saturday, August 19th, 11:59PM CT  Course closes on D2L, final report is due

Sunday, June 3rd 11:59 PM CT      Quiz 1 Due
Sunday, June 10th 11:59 PM CT     Quiz 2 Due
Sunday, June 17th 11:59 PM CT     Quiz 3 Due
Sunday, June 24th 11:59 PM CT     Quiz 4 Due
Sunday, July 1st 11:59 PM CT      Quiz 5 Due
Sunday, July 8th 10th 11:59 PM CT Quiz 6 Due
Sunday, July 15th 11th 11:59 PM CT Quiz 7 Due
Sunday, July 22nd 11:59 PM CT     Quiz 8 Due
Sunday, July 29th 11:59 PM CT     Quiz 9 Due
Sunday, August 5th 11:59 PM CT    Quiz 10 Due
Sunday, August 12th 11:59 PM CT   Quiz 11 Due
Saturday, August 18th 11:59 PM CT Quiz 12 Due
Saturday, August 18th 11:59 PM CT Quiz 13 Due
Saturday, August 18th 11:59 PM CT Quiz 14 Due
Saturday, August 18th 11:59 PM CT Quiz 15 Due
Saturday, August 18th 11:59 PM CT Final Report Due in D2L Dropbox

Recommended Schedule: This course is, once again, largely self-paced, but please refer to the due dates above for guidance on completing the course assignments. I'll be monitoring your progress throughout the semester and will send friendly reminders if I feel that you are falling behind.