Atm Sci 109 (Online): Thunderstorms, Tornadoes, and Hurricanes
UWinteriM 2024

Instructor: Prof. Sergey Kravtsov

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

Course Prerequisites: None

Course Description:
Atm Sci 109 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. It 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 fourteen modules for the course, each followed by a quiz. Students may take each quiz up to three times, and only the final score is given after each attempt. The highest score of the three is the only one that counts toward your final course grade. 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 throughout the semester, but students are strongly encouraged to adhere to the due dates (see the schedule at the end of this syllabus)

This course also includes a final report, due in the drop box on Canvas by 11:59 pm CT Saturday, January 20. 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 one to three 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 (including the details on the use of AI tools such as ChatGPT).

Grading: Module Quizzes 84%, Final Report 16%

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

Attendance: **Due to a compressed format of this course, there is not much flexibility in the tentative schedule!** However, time spent working on the material will not be part of the grading. I will be monitoring 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:	14 hours (1 hour per module)
Time spent commenting on and reading discussion boards:	14 hours
Time spent completing the final report:	26 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 ensure 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: https://uwm.edu/deanofstudents/academic-misconduct-2/

Complaint Procedures: Students may direct complaints to the Atmospheric Science Program Coordinator (Prof. Clark Evans, GLRF3003C, evans36@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://uwm.edu/titleix/what-is-title-ix/

Important Dates:

Tuesday, January 2rd	Instruction begins
Saturday, January 20th	Last day of UWinteriM classes
Saturday, January 20th, 11:59PM CT	Course closes on Canvas, final report is due

Tuesday, January 2rd 11:59 PM CT	Quiz 1 Due
Wednesday, January 3rd 11:59 PM CT	Quiz 2 Due
Thursday, January 4th 11:59 PM CT	Quiz 3 Due
Friday, January 5th 11:59 PM CT	Quiz 4 Due
Monday, January 8th 11:59 PM CT	Quiz 5 Due
Tuesday, January 9th 11:59 PM CT	Quiz 6 Due
Wednesday, January 10th 11:59 PM CT	Quiz 7 Due
Thursday, January 11th 11:59 PM CT	Quiz 8 Due
Friday, January 12th 11:59 PM CT	Quiz 9 Due
Monday, January 15th 11:59 PM CT	Quiz 10 Due
Tuesday, January 16th 11:59 PM CT	Quiz 11 Due
Wednesday, January 17th 11:59 PM CT	Quiz 12 Due
Thursday, January 18th 11:59 PM CT	Quiz 13 Due
Friday, January 19th 11:59 PM CT	Quiz 14 Due
Saturday, January 20th 11:59 PM CT	Final Report Due in Canvas Dropbox

Recommended Schedule: Due to a compressed course format, there is not much flexibility in the schedule, and you are expected to stay on track according to the due dates above.