ATM S 103: Hurricanes and Thunderstorms: Their Science and Impacts

SPR21 Syllabus

Instructor: Prof. Alexandra Anderson-Frey (akaf@uw.edu)

- Office Hours:
  - Monday 12:30-1:30 PM [https://washington.zoom.us/s/99782956907]
  - Tuesday 3:30-4:30 PM [https://washington.zoom.us/j/95515990674]
  - or by appointment (e-mail me to set up!)

TA: Pedro Angulo-Umana (pangulo@uw.edu)

- Office Hours:
  - Wednesday 2:00-3:00 PM [https://washington.zoom.us/j/92366668202]
  - Thursday 11:00 AM-12:00 PM [https://washington.zoom.us/j/97197786341]
  - or by appointment (e-mail Pedro to set up!)
- Exam Review Sessions: TBD

Class meets: Online-only! Modules on Canvas will walk you through the material for each lecture, which include quizzes integrated into the lecture videos. All midterms and exams take place on Canvas.

Our goal: To explore the science, history and impacts of thunderstorms and hurricanes. We will examine the basic processes responsible for both types of storms, and for the lightning, hail, tornadoes, high winds, and storm surges that accompany them. Significant historical examples will be presented, along with their impact on human activities and strategies for personal safety and societal adaptation.

Textbooks: *The AMS Weather Book* (for the science of thunderstorms, hurricanes, and a bit of general meteorology) by Jack Williams and *Divine Wind: The History and Science of Hurricanes* (for hurricane history and impacts) by Kerry Emanuel.

Grading:

- In-Lecture Quizzes 10%
- Homeworks 25%
- Two Midterms 20% each
- Final 25%

Class Schedule Overview: (will be updated throughout the quarter, subject to change)

Week	Course Material	Reading/Reference
1-2	**Clouds**	
1	03/29: Course overview, water in the atmosphere 03/31: Condensation, relative humidity, dew point	*AMS Weather Book* • pp. 72-80

	04/02: Cloud condensation nuclei • Storm of the Week: Cyclone Idai	*Divine Wind* • pp. 3-5 and 18-21
2	04/05: Adiabatic cooling 04/07: Buoyancy, stability 04/09: Cloud types, lapse rate, stability	*AMS Weather Book* • pp. 81-95 *Divine Wind* • pp. 30-39
3-5	**Thunderstorms**	
3	04/12: Thunderstorm ingredients 04/14: Lightning 04/16: Lightning safety	*AMS Weather Book* • pp. 178-183, 189-196 *Divine Wind* • Chs. 9, 11, 13
4	04/19: Single cell thunderstorms, downdrafts, gust fronts, microbursts 04/21: Flash floods, raindrops, cloud microphysics 04/23: Hail, vertical shear, multicell storms	*AMS Weather Book* • pp. 184-188 *Divine Wind* • Chs. 15, 17, 19
5	04/26: Supercell thunderstorms, weather radar 04/28: **Midterm 1** 04/30: Tornado formation, Fujita scale	*AMS Weather Book* • pp. 141-145, 189-199 *Divine Wind* • Ch. 21
6	**Tornadoes**	
6	05/03: Tornado safety, non-mesocyclonic tornadoes 05/05: Mesocyclonic tornadoes 05/07: Tornado safety, adaptation, tornado climatology	*AMS Weather Book* • pp. 200-203 *Divine Wind* • Chs. 22-23
7-10	**Hurricanes**	
7	05/10: Hurricanes overview, structure 05/12: Coriolis force, TC climatology 05/14: TC lifecycle, tracks	*AMS Weather Book* • pp. 230-246 *Divine Wind* • Chs. 25-27
8	05/17: Storm surge, Galveston 05/19: **Midterm 2** 05/21: Ike, satellite imagery, ET transition	*AMS Weather Book* • pp. 247-257 *Divine Wind* • Chs. 31, 32, Epilogue
9	05/24: Katrina 05/26: TC forecast, impacts of ENSO 05/28: Superstorm Sandy	*AMS Weather Book* • pp. 118-123 NPR: 22 post-Katrina photos Reports of anarchy at Superdome overstated (Seattle Times) The pendulum of hurricane Katrina reporting (New York Times)
10	05/31: No class (Memorial Day) 06/02: Harvey, Irma, Maria, and Nargis 06/04: Climate Change	

Access and Accommodations

Your experience in this class is important to us, and it is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law. Disability Resources for Students (DRS) offers resources and coordinates reasonable accommodations for students with disabilities. If you have not yet established services through DRS, but have a temporary or permanent disability that requires accommodations, you are welcome to contact DRS at 206-543-8924 or uwdrs@uw.edu or visit disability.uw.edu. If you have already established accommodations with DRS, please use the information provided on the website for this course when submitting your Alternative Testing Contract to DRS via their online system. Students with accommodations are solely responsible for submitting the Alternative Testing Contract and scheduling the exams with DRS well in advance of the exam dates.

Academic Honesty

At the University level, passing anyone else's scholarly work (which can include written material, exam answers, graphics or other images, and even ideas) as your own, without proper attribution, is considered academic misconduct. Plagiarism, cheating, and other misconduct are serious violations of the University of Washington Student Conduct Code (WAC 478-120, http://www.washington.edu/cssc/student-conduct-overview/student-code-of-conduct/). We expect that you will know and follow university policies on cheating and plagiarism. Any suspected cases of academic misconduct will be handled according to university regulations. For more information, see the College of the Environment's Academic Misconduct Policy (https://environment.uw.edu/intranet/academics/academic-integrity/academic-misconduct/Links to an external site.) and the Community Standards and Student Conduct website (http://www.washington.edu/cssc/ (Links to an external site.)Links to an external site.).

Student conduct

All UW students agree to abide by, and familiarize themselves with, the Student Conduct Code when enrolling at the University of Washington. All students in ATM S courses are expected to abide by the Student Conduct Code (also known as WAC 478-120). The possession, use, or distribution of controlled substances, firearms, and dangerous weapons will not be tolerated. Physical abuse, sexual harassment, or harassment of any kind, for any reason, will not be tolerated. Violations will be immediately reported to the Community Standards and Student Conduct, and possibly the UW Police Department. The Student Conduct Code can be viewed at: http://apps.leg.wa.gov/WAC/default.aspx?cite=478-120 If you have questions or concerns regarding an alleged violation of the Student Conduct Code please contact your instructor, ATM S Student Services (206-543-4576 or chaelan@atmos.uw.edu), or Community Standards and Student Conduct (206-685-6194 or cssc@uw.edu).