

EAS 2750 or PHYS 2750: Physics of the Weather – Fall 2026

Section: A

Number of Credits: 3

Course Instructor

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Course Description

You have experienced many weather events and the changing seasons throughout your life. In this class we will focus on the basic physical and dynamical principles driving meteorological phenomena on a variety of space and time scales. This includes (but is certainly not limited to): Earth's seasons, climate differences between locations, thunderstorms (including severe weather hazards), hurricanes, extratropical cyclones, precipitation types and more mundane phenomena such as non-precipitating clouds, fog, prevailing wind directions, and even clear skies.

You will apply scientific principles to develop an understanding of meteorological phenomena through learning meteorological theory and analysis of “real” data. This includes analyzing time series and observational data, forecast data (both from Numerical Weather Prediction models as well as Artificial Intelligence/Machine Learning-driven forecasting), weather maps, and sounding data.

Course Learning Outcomes

Our goal is to develop the following scientific skills below in the context of course material:

- 1) Understand the basic physical principles of atmospheric science
- 2) Demonstrate understanding of “why” and “how” meteorological phenomena develop
- 3) Access, analyze and physically interpret meteorological data
- 4) Apply your understanding of meteorology towards critically analyzing data and drawing conclusions supported by physically accurate scientific evidence.

Recommended (but not required) Texts

- 1) Ahrens, D.C. (2016), Meteorology Today, 12th edition, Cengage Learning; ISBN-13: 9781337616669.
- 2) Stull, R. B. (2017), Practical Meteorology: An Algebra-based Survey of Atmospheric Science, Univ. of British Columbia; ISBN-13: 9780888651761. URL: https://www.eoas.ubc.ca/books/Practical_Meteorology/

Grading Policy - Ungrading

This semester, an “ungrading” approach will be used to determine your grade within this course (adopted from Dr. Janel Hanrahan’s dynamics course at Northern Vermont University). Below is an explanation of the “ungrading” grading system as well as likely questions about this method:

How will this work?

- During the first week of the semester, you will fill out a pre-class assessment to create three goals for yourself to help you succeed within this course. You will also think about how you will assess yourself for each mid-semester assessment, in particular how you

will weigh each assignment type in this course and use qualitative feedback to advocate for the course grade that you have earned at each checkpoint during the semester.

- After completion of any summative course assignments and assessments, the course instructor will provide feedback on the assignments but NOT a score or letter grade. The feedback will provide information about your successes within the assignments as well as what needs to be corrected or improved.
- You will have one week after each assignment to resubmit based on the feedback provided to improve your performance on the assignment.
- There will be two mid-semester evaluation periods in which you will evaluate your performance in the course and assign yourself a letter grade. This letter grade must be supported by evidence from your performance in the class and also supported by evidence observed by the course instructor. Rubrics will be provided to help assess yourself during these checkpoints during the semester.
- At the end of the semester, you will evaluate your performance in the course one last time, and this evaluation will require you to assign a letter grade for the course. Again, evidence of your performance from the semester will be used, along with confirmation from the course instructor, to determine your final grade.

Description of Assignments and Assessments to be Ungraded

- Course Engagement – This ungrading component focuses on any factors that demonstrate a student’s commitment to positioning themselves best for success within the course. This can be assessed in a variety of ways, including (but not limited to) any of the following:
 - Showing up to class on time and minimizing unexcused absences (i.e., absences in which no instructor notification is provided)
 - Engaging within in-class discussion of course material – examples include:
 - Raising hand and answering questions during class
 - Engaging within in-class activities
 - Collaborating with others in-class with respect to course material discussion and/or practice problems
 - Visiting office hours to ask questions
 - Emailing or Canvas messaging the course instructors to ask questions
- Knowledge Checks – Summative assessments for this course will take the form of “knowledge checks” within class when assigned. Knowledge checks will assess students’ understanding of course material. Students will have two attempts on each knowledge check, with the second attempt allowing students to review positive and constructive feedback from the course instructors to demonstrate knowledge proficiency and growth. A rubric will be provided for each knowledge check that assesses student performance based on a combination of knowledge content understanding, ability to communicate responses through writing in a manner that clearly and concisely demonstrates one’s thought process in arriving at their responses.
- Meteorological Application Activities – The following activities listed below are designed to help students strengthen relevant “soft skills” that require one to go “above and beyond” simply demonstrating proficiency with respect to course content.
 - WxChallenge – this is a national forecasting competition in which students will compete against other students, faculty and alumni across the U.S. in submitting

forecasts 4 evenings per week for 5 U.S. cities throughout the semester. This is a great way to learn the basics of weather forecasting and actually “be the forecaster!”. More details about this will be revealed during class.

- Weather Briefing – Students will take turns within small groups starting off each class with a 5-minute maximum weather briefing. Students will be required to share a weather forecast of either Atlanta, GA or the WxChallenge forecast city of interest. The goal of such assignments is to provide students with practice with communication of complex meteorological material to their scientific peers (i.e., their classmates) in a clear, concise and accurate manner.
- Meteorological Data Analysis Project – Throughout the course, students will make steady progress toward investigating meteorological data extracted from local or statewide resources or from an archived extreme weather event of interest. The goal of this project is to acquire data, read the data into Python, MATLAB, Excel, or an equivalent computer programming language/data analysis tool, analyze the data and create figures that provide meaningful insight into one or more meteorological aspects of interest. The key deliverables from this project will be the following:
 - Making the data accessible to the class
 - Providing a summary in writing, GitHub, Jupyter Notebook, etc...of how all figures of interest were made
 - Presentation to class about project

More information about this project will be discussed throughout the semester. The goal of this project is to strengthen students’ data acquisition, analysis and evaluation skills along with communication of scientific material to an audience of one’s peers.

Attendance Policy

You are required to attend every class period. If you are unable to attend class due to an excused absence, please notify the course instructor or TA 24 hours prior to the start of class or ASAP if the reason for an absence emerges the day of class.

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review Georgia Tech’s Honor Code and the student Code of Conduct.

Any student suspected of cheating or plagiarism on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The Student-Faculty Expectations articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

Other Course Procedures & Policies

Communication: Communication regarding anything and everything related to this class will utilize Canvas announcements and messages. Please make sure that your Canvas messaging/announcements is linked to your Georgia Tech email account or that you are frequently checking your Canvas messages and the Canvas page. **It is your responsibility to read all messages, including ALL message content.**

Late Policy: No late assignments will be accepted unless a valid reason for submitting an assignment late is discussed with the course instructor **at least 24 hours in advance of assignment due date or ASAP on the day of the assignment due date if an unexpected illness or emergency arises.**

Extra Credit: Given the ungrading methodology utilized within this course, no extra credit opportunities will be provided.

Artificial Intelligence: We now live in a world where AI is everywhere, and it is very convenient to use for a lot of day-to-day applications. This also includes looking up answers to questions for courses as well as assisting (or fully writing) answers or papers on written assignments. Here is a breakdown of when AI is authorized vs. unauthorized in this course, noting that **any unauthorized use of AI is a violation of the Georgia Tech Academic Honor Code:**

When AI is **authorized** in this course:

- Assisting with note taking during lecture
- Double-checking information related to in-class activities
- Producing figures and code for the course project provided that all AI prompt information and output are provided when submitting final course project deliverables

When AI is **unauthorized** in this course:

- Knowledge Checks – this includes both attempts for each knowledge check assessment

Undergraduate Student Academic Success Resources

A list of resources for undergraduate students' academic success and information about advising can be found at [Success at Tech](#).

Academic Support: Academic Success and Advising (a unit in the Office of Undergraduate Education & Student Success) provides free support for your courses. Students can attend scheduled supplemental review (PLUS) sessions, stop by Drop-In Tutoring, or schedule a one-

on-one appointment through Knack. To explore what options work best for you, please visit us online at success.gatech.edu/tutoring, email us at tutoring@gatech.edu, or come see us at Clough Undergraduate Learning Commons, Suite 283.

Student Well-Being

At Georgia Tech, we are concerned about your overall physical, social, and mental well-being. A comprehensive list of wellness related resources has been compiled and maintained by the Office of the Vice President for Student Engagement and Well-being (<https://students.gatech.edu/student-resource-guide>).

More resources on supporting student well-being on the syllabus and beyond are available through the [Learning Well Initiative](#).