

EVSC 3300: Atmosphere and Weather (3 credits)
Fall 2021
Clark Hall Room 108
MWF 10:00 a.m. – 10:50 a.m.

Instructor

Kevin Grise
Office: 380B Clark Hall
Email: kmg3r@virginia.edu
Phone: (434) 924-0433

Office Hours

Wednesdays and Fridays 11:00 a.m. – 12:30 p.m., or by appointment
(Zoom link on Collab, or in 380 Clark Hall conference room)

Course Description

This course introduces the physical laws governing the behavior of Earth's atmosphere, weather, and climate. It provides a foundation for future studies in meteorology, atmospheric science, or climate, by providing an overview of the physical principles of atmospheric radiation, thermodynamics, and fluid dynamics. Upon completion of this course, you will be able to identify and understand atmospheric phenomena that influence weather and climate.

Questions to be answered this semester will include:

- What is the greenhouse effect?
- Why is it typically warmer on a cloudy night but cooler on a cloudy day?
- Why do air pressure and temperatures vary with altitude?
- How do clouds and precipitation form?
- Why does the jet stream exist?
- Why do winds blow counterclockwise around low-pressure systems in the Northern Hemisphere?

A detailed course outline is provided under the [Schedule tab](#) on the course Collab website. Please check the outline regularly as it will be updated throughout the semester with readings, lecture notes, and problem sets.

Prerequisites

Required: One semester of calculus
Recommended: At least one semester of college physics with lab such as PHYS 1425/1429

Recommended Textbook

Meteorology Today: An Introduction to Weather, Climate, and the Environment, 13th Edition, by C. Donald Ahrens and Robert Henson, Brooks/Cole, 2022

- You can use the 9th–12th editions of this book if you prefer!

Online Supplement to Textbook (FREE)

Practical Meteorology: An Algebra-based Survey of Atmospheric Science, by Ronald B. Stull, University of British Columbia, 2017

- Available at https://www.eoas.ubc.ca/books/Practical_Meteorology/

Other Useful References

Meteorology for Scientists and Engineers by Ronald B. Stull (Second Edition)

Atmospheric Science: An Introductory Survey by John M. Wallace and Peter V. Hobbs, Academic Press, 2006 (Second Edition)

Meteorology: Understanding the Atmosphere by Steven A. Ackerman and John A. Knox (Third Edition)

Assessment and Evaluation

Grades for the course will be based on exams, problem sets, and class participation.

Exam 1 (Monday September 27): 25%

Exam 2 (Friday October 29): 25%

Exam 3 (Monday December 6): 25%

Problem Sets: 15%

Class Participation: 10%

Exams: Three exams will be held during regular class periods on the dates listed above. The exams will primarily be essay-type questions and quantitative problem solving, but will also include some short answer and multiple-choice questions. The exams will not be cumulative (i.e., the third exam will **not** be a cumulative final, and will be held on the last day of class). The exam questions will be based almost entirely on material presented and discussed **in class**. If students have an officially sanctioned university conflict (academic or athletic activity), they will need to notify the course instructor as soon as possible, so that alternative arrangements can be discussed with the appropriate coach/advisor. Students who miss exams without prior approval of the instructor will receive a zero on the exam.

Problem sets: One problem set will be assigned approximately two weeks prior to each exam. Problem sets and due dates will be posted to the Collab website and announced in class. The problem sets will provide practice for the types of quantitative and longer-answer questions that can be expected on exams. For quantitative problems, students must show the mathematical steps necessary to reach their solution to receive full credit on a problem, and **units** must be attached to numerical answers where appropriate. Students are encouraged to work together to solve the problem sets, but must turn in their own solutions. Copying of another student's solutions is a violation of the Honor Code.

Class Participation: It can often be intimidating in large classes to raise your hand to ask a question or to clarify something that seems confusing. To help you assess your own understanding of the concepts discussed in class, we will be using the online classroom response system, *Learning Catalytics* (<https://learningcatalytics.com/>).

This replaces in-class quizzes, and hopefully will make our daily class meetings more interactive and fun for you. To use *Learning Catalytics*, you need to do two things: 1) bring a fully charged web-enabled device (laptop, smartphone, or tablet) to every class, and 2) **sign up on the *Learning Catalytics* website (\$12 for the semester)**. If you do not have regular access to a web-enabled device in class, please talk with me, and alternative arrangements can be made. To receive full class participation points, you must answer at least 90% of the questions throughout the semester. If you answer 80% of the questions, you will receive 90% class participation, 70% of the questions = 80% class participation, etc. **There will be no penalty for incorrect answers.** However, students who systematically enter blatantly incorrect answers will receive one warning. Subsequent offenses will result in a zero grade for that day's *Learning Catalytics* questions.

Extra Credit: During the last month of the semester (tentatively starting November 1), we will have a class weather forecasting contest. Students who do well in the contest will receive extra credit toward their final grade. The contest is optional, and there will be no penalty for poor forecasting or not participating. Details will be provided later as the contest approaches.

Grading Scale

The final grade will be based on the following grading scale:

A+: 100+	A: 93-99	A-: 90-92
B+: 87-89	B: 83-86	B-: 80-82
C+: 77-79	C: 73-76	C-: 70-72
D+: 67-69	D: 63-66	D-: 60-62
F: Less than 60		

Laboratory

The laboratory is a one-credit independent course, which is required for Environmental Sciences majors and minors. Taking the laboratory will enhance understanding of the material covered in lectures and provide hands-on learning experience. Five laboratory sessions are offered (all sessions meet in 115 Kerchof). Students should enroll in one laboratory session only. A laboratory manual, available on the Collab course website, is required. Graduate teaching assistants run the laboratories. Questions related to the laboratories should be addressed to the teaching assistants.

IMPORTANT: Students **not** enrolled in the laboratory course are strongly encouraged to attend one of the weekly laboratory sessions during the week of the skew-T lab (tentatively the week of October 18). Skills practiced in this lab will be tested on the second exam, and it is highly recommended that you attend one of the lab sessions for this week.

Technology Policy

To use *Learning Catalytics*, you'll need to bring a fully charged web-enabled device (laptop, smartphone, or tablet) to every class. If you prefer to take notes on paper, I would recommend you sit toward the front of the classroom, and use your electronic device only for the *Learning Catalytics* activities. If you prefer to take notes on your laptop or tablet, I would recommend you sit toward the back of the room, to allow a screen-free environment for those wishing to take notes on paper.

Please use your electronic devices judiciously, as a courtesy to others in the classroom. If you are distracting other students by using an electronic device for non-class-related purposes, you will be asked to leave class. Except for calculators, the use of electronic devices during exams is **not** permitted, and students seen using these devices during an exam will receive an automatic zero.

Questions??

Class participation and asking questions in class is strongly encouraged.

Questions outside of class can be addressed to the instructor via email, or during office hours. Graduate teaching assistants will also be available to answer questions during their office hours (as announced in the lab sessions). Please schedule an appointment to meet with the instructor and TAs outside of office hours.

A Word about the Fall 2021 Semester

As we start this semester, it's fair to say that many of us have conflicted emotions about the upcoming semester and are preoccupied with the challenging time that we are living in. Some of us are excited to be back having class in person, while some of us are fearful about what the upcoming semester might bring. Over the past 18 months, many of us have been and still are concerned about our own health and/or the health of friends and family. Many of us have felt or are feeling socially isolated and unable to connect in person with friends or family. Many of our families are suffering from financial difficulties, are grieving over the loss of a loved one, or know of someone who is. Many of us are deeply concerned about our world, our nation, and the injustices and inequalities that persist in our society.

In light of these issues, I would encourage all of us to be especially compassionate and forgiving to one another as we go through this semester. It is my intention as your professor to be as accommodating as possible. Everyone's situation is unique, so please don't hesitate to reach out to me if you feel that you will have personal difficulties fulfilling the requirements of the class as specified on the syllabus.