EVSC 3300: Atmosphere and Weather (3 credits)
Fall 2019
Clark Hall 107
MWF 10:00 a.m. – 10:50 a.m.

**Instructor**
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**Office Hours**
Wednesdays and Fridays 11:00 a.m. – 12:30 p.m., or by appointment

**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**
- You can use the 9th, 10th, or 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 (on reserve: Science and Engineering Library, Clark Hall)
Meteorology for Scientists and Engineers by Ronald B. Stull (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 (September 30): 25%
Exam 2 (November 6): 25%
Exam 3 (December 16, 9 a.m. – noon): 25%
Problem Sets: 15%
Class Participation: 10%

Exams: Three exams will be held on the dates listed above. The first two exams will be held during regular class periods, and the third exam will be held during the scheduled final exam period. 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). 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 11), 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+: 98-100  A: 93-97  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 21). 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 in person 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.