Course Syllabus
Atmospheric Sciences 2940: Basic Meteorology

Prerequisites: Math 152 or 1151 and Physics 132 or 1251

Instructor: Joseph Chan (address as "Dr C")
Office: Room 1132 Derby Hall
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Class Meetings: Lecture MWF 1:50-2:45
Classroom: Derby Hall 080
Office hours: Fridays from 3:00 PM to 5:00 PM, OR by appointment.

There will be no lectures on:

Dates	Day of Week	Notes
Jan 15	M	MLK day
Jan 29, 31	M, W	Conference travel
Mar 11, 13, 15	M, W, F	Spring break

Course Objectives: The main objective of this course is to introduce students to the fundamentals of meteorology. Students will be introduced to the physical laws that underlie our understanding of atmospheric processes. Physical processes will be integrated to explain basic atmospheric phenomena. Knowledge of the physical laws and their meteorological applications will facilitate students' comprehension of meteorological processes that determine the weather. The increased comprehension of important physical processes will improve students' ability to analyze and to forecast the state of the atmosphere. This course thus improves students' understanding of atmospheric phenomena on many spatiotemporal scales.

Course Structure: Recorded lectures available online. Lectures will present material on the fundamental principles influencing the Earth's atmosphere and their application to atmospheric situations. Important equations and their implications will be presented. Examples of meteorological problems will be discussed. Homework problems that involve the application of material introduced in class will also be assigned and discussed during recitations.

Textbooks: There is no required textbook for this course but if students want a reference, here are some suggestions:

1. *Meteorology Today: An Introduction to Weather, Climate and the Environment* by C. Donald Ahrensen,12th edition, Thompson Brooks/Cole is a good source. The 11th to 9th editions could be used in place of the 12th edition.
2. *Understanding Weather and Climate*, 7th edition by E. Aguado and J. E. Burt, 2012. Pearson Education, Inc. Upper Saddle River, NJ. (ISBN: 9780321769633). The 6th or 5th editions could be used in place of the 7th edition.

Grade Generating Activities:

The overall course grade will be determined according to student performance in the following activities and weights:

Activity	**Weight**	**Due Dates**	**Day of Week**
Exam 1	10 %	Feb 12	M
Exam 2	15 %	Mar 11	M
Final Exam	20 %	Apr 24	W
Homework	45 %	5 problem sets	M
Class Participation	10 %	5%: Present HW solution in-class	
		5%: Entrance and exit surveys	

A note on due times and tardiness: Unless otherwise noted, "due date" stands for 11:59 PM of the due date. Late work not justified by a university-sanctioned excuse can be turned in up to one (1) week after its due date and will be discounted in 10%. No late unexcused submissions will be accepted after one week of their due date.

Exams: All three exams will have the same length and format. They will be conducted online and will be open book. **While exams will remain available on Carmen between 6:00 AM and 9:00 PM of their due date, once students begin to take an exam, they will have 90 minutes to finish it.** Note that to have access to all 90 minutes, students should start taking the exam no later than 7:30 PM of the due date. Reinforcing with an example, students will be able to start taking the exam at 8:55 PM of the due date, but if they choose to do so, they will only have 5 minutes to answer questions before being locked out of it.

Note that the due time of exams, differently from those of most course activities, is not 11:59 PM of the due date.

Exam format will be a mixture of multiple choice and short essay questions. Some questions will involve calculations similar to those required by the problem sets.

Exams are designed to test your comprehension and understanding of the material, as well as your ability to recall basic meteorological principles.

Problem sets: Problem set assignments are designed to accomplish several goals. The first goal is to give students some experience solving basic meteorological problems using concepts introduced in class. A second goal is to make students think about the physical processes that occur in certain

atmospheric phenomena. More challenging problems may require students to combine physical principles in order to arrive at the solution to the problem. Some problems will be similar to the tasks require of operational meteorologists. Other problems will deal with fundamental principles and calculations that are used to develop meteorological models and software.

Collaboration between students is encouraged for all course activities (except exams). That being said, the work on a problem set is expected to be the work of the student whose name appears on it. **Copying another student's work is plagiarism and is considered to be academic misconduct.** Students who engage in this behavior will face the potential negative consequences associated with it.

A note on units: **Numerical answers are incomplete unless they are accompanied by the correct units**. Students will lose points on examinations and problem set assignments if the units are incorrect or missing.

On the use of artifical intelligence (AI) tools: The use of AI tools is permitted in this class (homework and examinations). If you use AI tools in your homework and examinations, please do write a sentence in your submission to tell me that you used these tools (example sentence: "I used NAME_OF_TOOL in Problem 1a in this Homework"). **Use of AI tools without disclosing that usage may be considered academic misconduct** and subject to investigation and disciplinary action (see "Academic Misconduct" section below).

Note that AI tools can give erroneous answers. The instructor will be setting problems that AI tools may not be able to answer accurately (particularly large language models). If you use AI tools in the homeworks/examinations, you are responsible for checking those answers.

Academic Misconduct: It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. The Code of Student Conduct defines "Plagiarism is the representation of another's works or ideas as one's own; it includes the unacknowledged word-for-word use and/or paraphrasing of another person's work, and/or the inappropriate unacknowledged use of another person's ideas." Instructors shall report all instances of alleged academic misconduct to the Committee (Faculty Rule 3335-5- 847). For additional information, see the Code of Student Conduct (http://studentaffairs.osu.edu/info_for_students/csc.asp).

Disability Services: Students with disabilities that have been certified by the Office for Student Life Disability Services will be appropriately accommodated, and should inform the instructor as soon as possible of their accommodations. The Office for Student Life Disability Services is located in 098 Baker Hall, 113 W. 12th Avenue; telephone 614-292-3307, VRS 614-429-1334; http://www.ods.ohio-state.edu/.

Outline of topics*

1. Course Overview
2. Math and Science Refresher
3. Moist Air Gas Law
4. Layers of the Atmosphere and Hydrostatic Balance
5. Phase Changes of Water (solid-liquid-gas)
6. Stability and Dry Adiabatic Ascent/Descent Moist Adiabatic Ascent and Skew-T
7. Radiation, Radiation Energy Balance, and Seasons

8. Atmospheric Dynamics: Pressure Gradients, Coriolis Force, Surface Flow, Upper-Level Winds
9. General Circulation Patterns
10. Clouds and Precipitation
11. Airmass Thunderstorms
12. Air Masses, Fronts, and Extratropical Cyclones
13. Thunderstorms, Tornadoes and Hurricanes
14. Urban Effects on Weather
15. Climate and Climate Change

* This is a tentative list that is subject to change