GEOGRAPHY 1900

Extreme Weather and Climate

Autumn Semester 2025

Instructor:

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Course Details

Lecture: Monday, Wednesday and Friday, 12:40 to 1:35 PM – Pomerene Hall 160

Labs:

Mondays, 10:20– 11:15 AM in Derby Hall (DB) 0070 –

Mondays, 3:00 – 3:55 PM in Derby Hall (DB) 0070 –

Wednesdays, 10:20– 11:15 AM in Derby Hall (DB) 0070 –

Wednesdays, 3:00 – 3:55 PM in Derby Hall (DB) 0070 –

Course Materials

Suggested Text: Aguado, E. and J. E. Burt, 2012. *Understanding Weather and Climate*, 7th edition. Pearson Education, Inc. Upper Saddle River, NJ. (ISBN: 9780321769633)

Required Lab Manual: A pdf file of the Manual is also available on Carmen.

Website: The Carmen course management system http://carmen.osu.edu

Course Description

This course will serve as an introduction to the study of the atmosphere. The primary objective is to provide students with a comprehensive understanding of the atmosphere and the processes that govern its behavior. In this course students will be exposed to various aspects of meteorology, including the structure and behavior of the atmosphere, global energy balance and transfer, atmospheric circulation, precipitation processes, weather systems and severe weather. This course will emphasize the inter-relationship existing between the atmosphere, hydrosphere, biosphere and lithosphere and will illustrate how the movement of matter and energy between

these spheres is responsible for the weather, climate and environments we experience on Earth.

Science GEC Course

Natural Science coursework fosters students' understanding of the principles, theories, and methods of modern science, the relationship between science and technology, the implications of scientific discoveries and the potential of science and technology to address problems of the contemporary world. Below are the four general Natural Science GE outcomes and how each will be addressed by the course.

1. Students understand the basic facts, principles, theories and methods of modern science.
    a. Lectures, textbook and exams for basic facts, principles and theories
    b. Labs will demonstrate and give hands on experience with basic methods, and reinforce understanding of principles with experiments.
2. Students learn key events in the history of science.
    a. Progressive understanding of atmospheric dynamics will be explained using key examples like mid-latitude cyclones.
    b. Basic history of meteorology and history of our understanding of anthropogenic climate change is explicitly covered by lectures.
3. Students provide examples of the inter-dependence of scientific and technological developments.
    a. Lab exercises will reinforce how technology infuses understanding, and how instrumentation to measure atmospheric phenomena has changed over time.
    b. Measurements of the atmosphere, its qualities and motions are key to atmospheric science, and lectures and readings will highlight specific examples of how technology has enhanced theoretical understanding, and vice versa.
4. Students discuss social and philosophical implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world.
    a. In lectures and readings about climate change, ozone destruction, and atmospheric pollution students will engage with the social implications of science discoveries and how these both mold and are molded by worldviews and political perspectives.

Student Evaluation

***Participation (20% of course grade)*:**

Attendance. 5 of the total 20 participation grade points will be based on lecture attendance. Each student is entitled to one unjustified absence during the semester. Participation will be recorded using TopHat. It is the student's responsibility to make sure their device is communicating correctly with TopHat.

TopHat Multiple Choice Questions. 15 of the total 20 participation grade points will be based on student response to multiple choice questions presented to the class via TopHat. Just answering the question, even if incorrectly, is all that is required for full participation points. It is the student's responsibility to make sure their device is communicating correctly with TopHat.

Note that to give students time work out any problems with TopHat, tracking of attendance and TopHat for participation will only start on Monday, Sep 8.

***Labs (30% of course grade)*:** Laboratory exercises will be conducted during recitations. Attendance is required. Students should read through each lab and be prepared **PRIOR** to the lab session. It is the responsibility of each student to turn in the required laboratory exercise at the beginning of the lab class on the due date. All lab exercises must be completed **INDIVIDUALLY**, although working in groups is encouraged. Teaching Assistants are the ones responsible for the Labs.

While the instructor will be happy to help with particular lab questions, the TA might grade things differently depending on what took place during a particular lab. It is always safer to settle lab doubts with your TA. Students should also approach the TA when it comes to arrangements on late or missed labs.

***Exams (50% of course grade)*:** There will be three exams, all to be completed online (Carmen) and open book. All exams have identical length and format: 50 questions with 35 being multiple choice and 15 true or false. Exams duration is 80 minutes, meaning students will have on average 1.6 minutes, or 96 seconds to answer each question. The time limit refers to the whole exam, there will be no time limit on individual questions.

Regular lectures and labs will take place on exam days.

Exams are mostly non-cumulative but questions about some important themes/concepts will be present in both exams. These themes/concepts will be clearly communicated to the class by a study guide prior to exams.

All exams will be available on Carmen.

- Exam 1 will have to be completed on Carmen sometime between 6:00 AM and 11:59 PM on Sep 26.
- Exam 2 will have to be completed on Carmen sometime between 6:00 AM and 11:59 PM on Oct 27.
- Exam 3 will have to be completed on Carmen sometime between 6:00 AM Dec 10 and 11:59 PM Dec 11. The longer open period for Exam 3 is related to the relatively busy schedule of students at the end of the semester. It is not different from the previous two in length, format, or approximate amount of content covered.

Students will be able to start taking these exams at any time during the periods described above, but once they start, they will have only 80 minutes to finish. To make use of all 80 minutes, students need to start taking the exams at or before 10:39 PM of the day the exam is due. Reinforcing with an example: If a student starts to take Midterm Exam 1 at 11:54 PM on Sep 26, they will only have five (5) minutes to answer all 50 questions before they get locked out of the exam by Carmen. If this takes place students will not have a second chance to answer any questions left blank.

Make-up exams are only allowed in the case of university sanctioned absences, a documented emergency or through **PRIOR** consent of the instructor.

Final Grade Break Up

Participation - Attendance	5%	
Participation - TopHat MC	15%	
Labs	30%	
Exam 1	15%	Sep 26
Exam 2	17.5%	Oct 27
Exam 3	17.5%	Dec 10

A note on final course grades:

The course adopts the following numerical to letter grade conversion:

Numerical Final Course Grade	Letter Final Course Grade
92.5-100	A
89.5-92.4	A-
86.5-89.4	B+
82.5-86.4	B
79.5-82.4	B-
76.5-79.4	C+
72.5-76.4	C
69.5-72.4	C-
66.5-69.4	D+
59.5-66.4	D
0-59.4	E

Final course numerical grades will be rounded to the closest decimal value prior to conversion to a letter grade. Note that, compared to the standard OSU numerical to letter grade conversion, the table above already contains a 0.5 point "round to the higher letter grade bump" at letter grade boundaries. This means that unless an error in grade calculation is noted, no other adjustments will be made.

For example: A student obtaining a final course numerical grade of 89.45 will have their grade rounded to 89.5 and will have earned an A- as final course letter grade. A student obtaining a final course numerical grade of 89.44 will have their grade rounded to 89.4 and will have earned a B+ as final course letter grade.

A note on the overall grades as seen on Carmen:

Due to a lack of connectivity between TopHat and Carmen and complications related to inserting extra credit grades on Carmen *the overall course grade students see on Carmen IS NOT CORRECT* and is usually an overestimate of the correct overall grade. An excel spreadsheet is available on the "Grade Calculation Spreadsheet" module in Carmen to aid students interested in tracking their overall grade during the semester. When adding attendance data to the spreadsheet students should use information obtained directly on TopHat and not the attendance percentages seen on Carmen.

Extra Credit

Three distinct activities will provide students with the opportunity of earning up to 5.5 extra points on their final course grade. There will be zero tolerance for late, incomplete, or incorrectly formatted extra credit submissions.

Late extra credit submissions = 0 points

Incomplete extra credit submissions = 0 points

Incorrectly formatted extra credit submissions = 0 points

Dec 10 in-class urban heat island effect mitigation activity: There is the potential for 1 extra credit point on the final course grade for those who are present in class on December 10 AND actively participate in a group activity related to urban heat island effect mitigation policies. Students will be presented with brief summaries of several available policies and, in groups of up to 5 members, discuss and choose what they believe is the best option for Columbus. At the end of the lecture, each group will turn in a brief (100-200 words) text justifying their choice. The expectation is that the text be completed during class and the submission is due on Dec 10 at 2:30 PM. Both presence in class AND being listed as a member of a group in the written justification is required. Present in class but not being a group member or being listed as a group member but not being present in class will result in no extra credit.

***The 1900 Weather Creative (Art Project)*:** Create and submit a piece of art in some way related to weather and climate or other content discussed in class for up to 2 extra credit points on the final course grade. The effort is individual. A variety of forms will be accepted, including but not limited to: poetry, music, short text, photography, painting/drawing, sculpture, animation, film, dance, short theatrical sketch and video games.

Important limitations:

- All submissions should be original efforts.
- Submissions are due on Monday, Dec 1.
- A representation of the piece must be uploaded to Carmen. This is simple for text or static images, but those who opt for performance (dance, theater), film, animation, song, etc… will have to record their work in some electronic format that can be uploaded.
- All submissions should have a maximum duration of two and a half minutes, or 150 seconds. This includes poetry and text (the average person talks at about 125-150 words per minute).

While connections might be somewhat indirect, submissions must be related to the subject of the course. You are required to attach a short (max 100 words) legend explaining the connection. The instructor will reject submissions deemed not sufficiently related to the themes discussed in class.
Submissions will be curated and, if there is sufficient quantity, quality, and time we will hold a show with the best entries during our next-to-last lecture on Dec 10. At this time the class will vote on their favorite submissions. There will be (simple) prizes for the top submissions!

Citizen science cloud observations: In this individual effort. Up to 2.5 extra credit points on the final course grade will be awarded to students who act as observers for the "Student Cloud Observations Online (S'COOL)" project. This is a NASA led citizen science initiative aimed at collecting cloud cover data in order to improve satellite-based observations. The amount of extra credit received will be determined by the total number of reports handed in. Each report is worth 0.1 points. These are accumulated until 2.5 extra credit points are obtained (25 reports). Students are encouraged to perform more than 25 observations, but those who do will still receive the maximum 2.5 extra credit points. To be valid, reports must be based on observations performed between Aug 27 and Dec 1. For full credit reports must be submitted to Carmen by 11:59 PM on Dec 1. Students can only submit one report per day. More details on how to perform observations and complete reports are found on CloudObs.docx file in the Extra Credit Module in Carmen.

Special Statement Regarding Absences

Based on the Office of the Provost recommendations on the current flu situation, students that feel ill are encouraged to stay home and isolate themselves from others. In addition, the "Explanatory Statement for Absence from Class" self-reporting form available online (https://shs.osu.edu/posts/documents/absence-excuse-form2.pdf) from the Wilce Student Health Center will be accepted as documentation of medical absence and reasonable efforts will be made to provide for make-up work opportunities. All make-ups from documented absences must be **completed within one week** of the original scheduled date.

Academic Misconduct

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University's Code of Student Conduct, and that all students will complete all

academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University's Code of Student Conduct and this syllabus may constitute Academic Misconduct.

The Ohio State University's Code of Student Conduct (Section 3335-23-04) defines academic misconduct as: Any activity that tends to compromise the academic integrity of the University or subvert the educational process. Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University's Code of Student Conduct is never considered an excuse for academic misconduct, so please review the Code of Student Conduct and, specifically, the sections dealing with academic misconduct.

If an instructor suspects that a student has committed academic misconduct in this course, the instructor is obligated by University Rules to report those suspicions to the Committee on Academic Misconduct. If COAM determines that a student violated the University's Code of Student Conduct (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in the course and suspension or dismissal from the University.

If students have questions about the above policy or what constitutes academic misconduct in this course, they should contact the instructor.

Religious Accomodation

Ohio State has had a longstanding practice of making reasonable academic accommodations for students' religious beliefs and practices in accordance with applicable law. In 2023, Ohio State updated its practice to align with new state legislation. Under this new provision, students must be in early communication with their instructors regarding any known accommodation requests for religious beliefs and practices, providing notice of specific dates for which they request alternative accommodations within 14 days after the first instructional day of the course. Instructors in turn shall not question the sincerity of a student's religious or spiritual belief system in reviewing such requests and shall keep requests for accommodations confidential.

With sufficient notice, instructors will provide students with reasonable alternative accommodations with regard to examinations and other academic requirements with respect to students' sincerely held religious beliefs and practices by allowing up to three absences each semester for the student to attend or participate in religious activities. Examples of religious accommodations can include, but are not limited to, rescheduling an exam, altering the time of a student's presentation, allowing make-up assignments to substitute for missed class work, or flexibility in due dates or research responsibilities. If concerns arise about a requested accommodation, instructors are to consult their tenure initiating unit head for assistance.

A student's request for time off shall be provided if the student's sincerely held religious belief or practice severely affects the student's ability to take an exam or meet an academic requirement **and** the student has notified their instructor, in writing during the first 14 days after the course begins, of the date of each absence. Although students are required to provide notice within the first 14 days after a course begins, instructors are strongly encouraged to work with the student to provide a reasonable accommodation if a request is made outside the notice period. A student may not be penalized for an absence approved under this policy.

If students have questions or disputes related to academic accommodations, they should contact their course instructor, and then their department or college office. For questions or to report discrimination or harassment based on religion, individuals should contact the Civil Rights Compliance Office.

Disability Services with Accommodations for Illness

The university strives to maintain a healthy and accessible environment to support student learning in and out of the classroom. If students anticipate or experience academic barriers based on a disability (including mental health and medical conditions, whether chronic or temporary), they should let their instructor know immediately so that they can privately discuss options. Students do not need to disclose specific information about a disability to faculty. To establish reasonable accommodations, students may be asked to register with Student Life Disability Services (see below for campus-specific contact information). After registration, students should make arrangements with their instructors as soon as possible to discuss your accommodations so that accommodations may be implemented in a timely fashion.

If students are ill and need to miss class, including if they are staying home and away from others while experiencing symptoms

of viral infection or fever, they should let their instructor know immediately. In cases where illness interacts with an underlying medical condition, please consult with Student Life Disability Services to request reasonable accommodations.

Lecture Schedule*

Lecture**	Chapter	Theme
1	1	Atmosphere Composition
2	1/2	Comp. of the Atm./Radiation
3	2	Radiation in the Atmosphere
4	2/3	Seasons/Energy Balance
5	3	Temperature
	Sep 26	**First Exam**
6	4	Pressure and Wind
7	4/5	Pressure and Wind /Moisture
8	5/6	Moisture / Cloud Formation
9	7	Precipitation Processes
10	8	Atmospheric Circulation
11	8/9	Air Masses and Fronts
	Oct 27	**Second Exam**
12	10	Mid Latitude Cyclones
13	11	Tornadoes
14	12	Tropical Cyclones
15	15/16	Climate and Climate Change
16	15/16	Climate and Climate Change
17	14	Atmospheric Pollution
	Dec 10	**Third Exam**

*This is a tentative schedule. While exam dates will not change, the actual material presented in lectures at the time of any exam might not mirror the schedule precisely. The material covered in each exam will be clearly defined on a study guide that will be published on Carmen.

**Lecture means a cohesive presentation covering a whole theme, not a 55-minute class.