

GEOGRAPHY 1900
Extreme Weather and Climate
Autumn Semester 2023

Instructor:

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Teaching Assistants:

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Adam Tjoelker

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Office Hours, Tuesdays from 1:00 to 3:00 PM; OR by appointment.

Course Details

Lecture: Monday, Wednesday and Friday, 10:20 to 11:15 AM – Evans Lab (EL) 1008

Labs: Monday, 11:30 AM– 12:50 PM in Derby Hall (DB) 0070 – Meg

Monday, 2:20– 3:40 PM in Derby Hall (DB) 0070 – Meg

Wednesday, 11:30 AM– 12:50 PM in Derby Hall (DB) 0070 - Adam

Wednesday 2:20– 3:40 PM in Derby Hall (DB) 0070 - Adam

Friday 11:30 AM– 12:50 PM in Derby Hall (DB) 0070 – Dammy

Friday 2:20– 3:40 PM in Derby Hall (DB) 0070 – Dammy

Course Materials

Text: Aguado, E. and J. E. Burt, 2012. *Understanding Weather and Climate*, 7th edition.

Pearson Education, Inc. Upper Saddle River, NJ. (ISBN: 9780321769633) **(Suggested)**

Lab Manual: Course packet distributed by UniPrint at <http://uniprint.osu.edu>, available at Barnes & Noble – The OSU Bookstore at Gateway/15th & High **(Required)**

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 (10% of course grade):

Attendance. 5 of the total 10 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. 5 of the total 10 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 the tracking of attendance and TopHat for participation will only start on September 6 (Wednesday) after labor day.

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, different TA's might grade things differently and it is always safer to settle lab doubts with TAs. Students should also approach the TA's when it comes to arrangements on late or missed labs.

Exams (60% of course grade): There will be three exams, two midterms and one final. All three will be 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 90 minutes, meaning students will have on average 1.8 minutes, or 108 seconds to answer each question. The time limit refers to the whole exam, there will be no time limit on individual questions.

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 Friday, Sep 29.
- Exam 2 will have to be completed on Carmen sometime between 6:00 AM and 11:59 PM on Wednesday, Nov 1.
- The Final will have to be completed on Carmen sometime between 6:00 AM and 11:59 PM of Thursday, Dec 12.

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 90 minutes to finish. To make use of all 90 minutes, students need to start taking the exams at or before 10:29 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 29, 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. All exams will take place at the regular lecture room.

Final Grade Break Up

Participation - Attendance	5%	
Participation - TopHat MC	5%	
Labs	30%	
Midterm Exam 1	20%	9/29
Midterm Exam 2	20%	11/1
Final Exam	20%	12/12

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. 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.

Extra Credit

Four distinct activities will provide students with the opportunity of earning up to 6.5 extra points on their final course grade. There will be zero tolerance for tardiness in extra credit submissions. Late extra credit submissions = 0 points.

Syllabus test: There is the potential for 0.5 extra credit point on the final course grade for those who turn in a perfect syllabus test. The test is available on Carmen and should be submitted online via Carmen by the end of the day (11:59 PM) on Friday, Sep 8. There will be no partial grades. To get the 1 extra credit point all responses must be correct. One error = no extra credit.

The 1900 Weather Creative: 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 can be individual or shared by up to two students. 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 Friday, November 24.
- 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 and quality, we will hold a show with the best entries during our next-to-last lecture on Monday, December 4. At this time the class will vote on their favorite submissions. There will be prizes for the top submissions!

Citizen science cloud observations: In this individual effort, up to 2 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 0.08 points. These are accumulated until 2 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 extra credit points. To be valid, reports must be based on observations performed between Aug 23 and Dec 6. For full credit reports must be submitted to Carmen by 11:59 PM on December 6. More details on how to perform observations and complete reports are found on the Extra Credit section in Carmen.

TopHat extra credit: Students who answer 80% or more of all TopHat multiple choice questions presented during lectures AND who get at least 50% of these right will receive 2 extra credit points on their final course grade. These are hard limits. Those who only answer 79.99% of presented questions or those who only get 49.99% of them right will not receive any of these extra credit points. Questions missed during excused absences will not count for this extra credit.

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

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. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct webpage (http://studentaffairs.osu.edu/resource_csc.asp).

Disability Services

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. You are also welcome to register with Student Life Disability Services to establish reasonable accommodations. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. **SLDS contact information:** slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

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 29		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
Nov 1		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 12		Final

*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.