

GEOGRAPHY 1900
Extreme Weather and Climate
Autumn Semester 2019

Instructor: Dr. Ning Zhang

Email: zhang.7819@osu.edu

Office: 1145 Derby Hall (DB)

Office Hours: Friday, 10:00 AM to 12:00 PM **OR by appointment**

Teaching Assistant: Gabriel Zeballos Castellon

Email: zeballoscastellon.1@osu.edu

Office: 136 Scott Hall | 1090 Carmack Road;

Office Hours: Tuesday, 4 PM to 6 PM **OR by appointment**

Course Details

- Lecture: Monday, Wednesday, 5:30 to 6:40 PM, University Hall 051
- Labs: Wednesday, 7:05 to 8:55 PM, Derby Hall (DB) 0070 (basement)

***NOTE: Students are required to register and attend both the lecture & lab sections weekly**

Course Materials

- **Textbook (Suggested):** Aguado, E. and J. E. Burt, 2012. Understanding Weather and Climate, 7th edition. Pearson Education, Inc. Upper Saddle River, NJ. (ISBN: 9780321769633)
- **Lab Manual (Required):** Course packet distributed by UniPrint at <http://uniprint.osu.edu>, available at Barnes & Noble – The OSU Bookstore at Gateway/15th & High

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.

This 4 credit lab course is structured around two weekly lectures of 70 minutes, and one weekly lab session of 110 minutes. The labs provide students with a more in-depth understanding of many of the same basic concepts discussed in lecture, along with new material. The labs include indoor and field exercises involving direct observations of the physical environment, using tools and methods practiced by scientists.

Upon successful completion of this course, students should (1) be able to describe the structure and composition of the atmosphere and how it has changed with time; (2) know the factors causing solar radiant energy variations on earth and be able to describe global radiation balance; (3) be able to explain the physical processes leading to the formation of atmospheric features including clouds, precipitation, winds and storms; (4) have a good understanding of the physical behavior of gases, and of the different forms of energy and their role in atmospheric motion and weather systems; (5) have a good understanding of environmental issues pertaining to the atmosphere including the "greenhouse effect", ozone depletion, air pollution and urban climate modification; and (6) be able to describe the general distribution on the world of temperature, precipitation and climates - and the factors and physical mechanisms which cause these distributions to occur as they do.

Student Evaluation

- (1) Attendance check (10 total) 10%
- **ABSENCE:** An official letter from your department or a doctor's note is required to excuse any absence. The doctor's note must include a name and telephone where we can contact them.
- (2) Labs (10 total) 30%
- **The TA has the full authority for instructing and grading the labs.** Lab assignments should be turned in to the TA. Any question about the labs should be directed to the TA.
- (3) Exams (3 total, 20% each) 60%
- Two mid-term exams and one final exam. Midterms are not cumulative. All exams will be multiple-choice.
 - **MAKE-UP EXAMS** are only allowed in the event of a documented emergency or through **PRIOR** consent of the instructor. Notice and valid documentation should be given to your TA **AT LEAST ONE WEEK** prior to make alternative arrangements.
- (4) Bonus (choose one of them) 5 pts
- Two distinct activities will provide students with the opportunity of earning up to 5 extra points on their final grade. **Student can select a 2-pages report or a 2-min presentation for bonus work (1)-(2). The bonus work (3) is only accepted as 2-pages report.**
- (1) "S'Cool" (35 days): Students' Cloud Observations On-line (<http://scool.larc.nasa.gov/rover.html>). In this project volunteers make daily observations of clouds which are uploaded to a NASA website and used in ground validation of satellite based estimations of cloud type and cloud coverage.
 - (2) "CoCoRaHS" (35 days): The Community Collaborative Rain, Hail and Snow network (www.cocorahs.org). In this program volunteers setup a rain gauge on their property and post daily observations of precipitation receipts.
 - (3) An art piece related to course content. It can be any format, such as a song, a poem, a video or a painting. The art piece will be judged by TA and other graduate students in the department of geography. A showcase of the selected pieces (Top 3) will be given during the last class. (Submitted: 2 pts, Top 3: 5 pts)

Please Note

- Lecture notes will be posted on the course website. The latest version is generally posted by noon the day of the lecture.
- We give a bonus assignment which increases 5 pts of your final grades. **Therefore no curve, or round-up will be given for labs, exams or final grades.**

Letter Grade Conversion

A: 100-93%; A-: 92-90%; B+: 89-87%; B: 86-83%; B-: 82-80%; C+: 79-77%; C: 76-73%; C-: 72-70%; D+: 69-67%; D: 66-63%; D-: 62-60%; E: 59% and below.

Class protocols:

We aim for an engaging and interactive class; please read carefully the following protocols that will hold, without exception, for all students.

- **MUTE your cell phone before class starts.** The use of cell phones, smart phones, and other mobile communication or media devices in class is disruptive to your colleagues' learning. In the classroom, be respectful of others.
- Use of a laptop or tablet or computing device is only permitted **for classwork** (e.g. taking notes, making calculations, using online material and Mastering) during lecture.
- **Slides are not class notes.** Lecture slides are condensed versions of material covered in class. There will be material presented, emphasized or discussed in class that will not appear on the lecture slides.

Academic Misconduct:

It is the responsibility of the Committee on Academic Misconduct (COAM) 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. For additional information, see the **Code of Student Conduct (<https://oaa.osu.edu/coam.html>)**. **Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487).** COAM will investigate or establish procedures for the investigation of all reported cases of student academic misconduct. If COAM determines that you have violated the Code of Student Conduct (i.e. committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal. If you have any questions about this policy or what constitutes academic misconduct in this course, please contact us.

Disability Services

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience barriers based on your disability (including mental health, chronic or temporary medical conditions), please inform the instructor immediately **at the beginning of the course**. Students are also welcomed to register with Office of Student Life Disability Services (SLDS), and will be appropriately accommodated upon registration. Bring forms to the instructor as soon as possible to be sure accommodations can 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. Student Evaluation

Lecture Schedule*

Week	Date	Theme	Readings
1	8.21	Atmosphere Composition-1	Chap 1
2	8.26	Atmosphere Composition-2	Chap 2
	8.28	Solar Radiation and Seasons-1	
3	9.2	NO CLASS- Labor Day	Chap 2
	9.4	Solar Radiation and Seasons-2	
4	9.9	Energy balance and Temp-1	Chap 3
	9.11	Energy balance and Temp-2	
5	9.16	Pressure & Wind-1	Chap 4
	9.18	Pressure & Wind-2	
6	9.23	Review-1	Chap 1-4
	9.25	Exam 1	
7	9.30	Atmospheric Moisture-1	Chap 5
	10.2	Atmospheric Moisture-2	
8	10.7	Cloud Formation-1	Chap 6
	10.9	Cloud Formation-2	
9	10.14	Precipitation Processes	Chap 7
	10.16	Atmospheric circulation-1	Chap 8
10	10.21	Atmospheric circulation-2	Chap 5-8
	10.23	Review-2	
11	10.28	Exam 2	Chap 9
	10.30	Air Masses and Fronts	
12	11.4	Midlatitude Cyclones	Chap 10
	11.6	Tornadoes-1	Chap 11
13	11.11	NO CLASS- Veterans Day	Chap 11
	11.13	Tornadoes-2	
14	11.18	Tropical Cyclones	Chap 12
	11.20	Climate Change-1	Chap 15, 16
15	11.25	Climate Change-2 (Bonus work due)	
	11.27	NO CLASS- Thanksgiving	
16	12.2	Review-3/ Showcase	Chap 1-12, 15
	12.4	Final Exam	

*This is a tentative schedule. The exam dates will not change. The material covered by each exam will be determined by what we have been able to cover in lecture. The scope of each exam will be clearly defined and communicated to the class by the instructor during the review session prior to each exam. +All exams take place during regular class times in the regular lecture room.