

**Geography 5900: Weather, Climate and Global Warming
Autumn 2016. 3 Units.**

Instructor: Dr. Steven Quiring

Office: 1124 Derby Hall

Telephone: 614-247-8222

Email: quiring.10@osu.edu

Office Hours: Monday and Wednesday, 1-2 pm and by appointment. Please feel free to contact me for a meeting at a time that is convenient for you.

Teaching Assistant: Alexander McCarthy (mccarthy.355@osu.edu); Office hours: Monday, 12:30-2:30 and by appointment (1070 Derby Hall)

Lectures: Monday, Wednesday, and Friday 11:30 a.m. – 12:25 p.m., Stillman Hall 235

Required Textbook: Understanding Weather and Climate, 7th Edition (2015), Aguado & Burt, ISBN-13: 9780321987303, Pearson

Note: You can use an earlier edition of the textbook to save money, but it is **your responsibility** to resolve any discrepancy between different editions. Material will be assigned based upon the 7th edition of the textbook.

Class Website: carmen.osu.edu

Course Objectives:

This course serves as an introduction to the fundamental physical and mathematical principles governing both day-to-day weather and the average of weather, or climate, of a region. The objective is to **understand the physical processes of the earth-atmosphere system and describe its weather features and climate characteristics**. This includes the energy receipt, loss, and redistribution in the earth-atmosphere system as well as the role of atmospheric moisture, its global spatial distribution, and its importance in energy exchange, and cloud and precipitation formation.

Course lectures will describe the causes, and the spatial distribution, of climates of the world as well as the physical mechanisms of some observed weather phenomena. The physical causes of and spatial variations in small- and large-scale motions of the atmosphere will be described. The distribution and causes of 21st century climate will be explained and the distributions of past climates, methods for reconstructing them, and the potential explanations for them will be discussed. The course will also consider how human activities have both intentionally and unintentionally become a factor in the physical processes of weather and climate. Weather and climate influences almost every aspect of our personal and professional activities. A goal of this class is to help students understand how the material covered in this class is related to their fields of interest and their daily lives.

Learning Objectives:

Upon successful completion of the 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 that cause solar energy variations on earth and be able to describe the 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 human impacts on the climate system, including global warming;
- (6) be able to describe the spatial and temporal patterns of global temperature, and precipitation –and the physical mechanisms that are responsible for these patterns.

Grading:

Your grade will be based on five parts:

Take-home assignments (choose 5; each worth 3%)	15%
In-class exercises (~6; each worth ~1.5%)	9%
Weather notebook (due November 9)	16%
Mid-term exams (2; each worth 20%)	40%
Final exam (December 15)	20%

There will be 6 take-home assignments (worth 3% each) that will be handed out in class (see Class Schedule for dates). Each student must complete at least 5 and submit them during class on the due date specified (typically one week after it is assigned). These are individual assignments and each student must submit their own work.

There will be ~6 in-class exercises that are worth ~1.5% each for a total of 9%. They are designed to reward those who attend class, so the dates of the in-class exercises will not be announced. These activities will require you to work with your classmates to solve problems related to the theories covered in class. These are typically collaborative exercises (one submission per group).

The weather notebook project will be assigned at the beginning of October and will be worth 16% of the final grade. This is an individual assignment and each student must complete their own weather notebook.

No late assignments (take-home or weather notebook) will be accepted. Assignments must be submitted in person during class (not by email).

Examinations will consist of multiple-choice questions with the answers entered on Scantron sheets.

- **Midterm 1** (Friday, September 30, in class) will test all topics covered before September 28.
- **Midterm 2** (Friday, November 4, in class) will test all topics covered during October.
- **Final exam** (Thursday, December 15, 2:00-3:45 pm) will test all topics covered

since Midterm 2. The final exam will be held in the same room as the lecture (Stillman Hall 235).

*Barring extraordinary circumstances there will be no make-up exams. Written documentation will be required and verified before a make-up exam will be considered. Students must contact the instructor **prior** to any exam to be considered for a make-up exam.*

The grading scale is:

A	= 93 to 100%
A-	= 90 to 92%
B+	= 87 to 89%
B	= 83 to 86%
B-	= 80 to 82%
C+	= 77 to 79%
C	= 73 to 76%
C-	= 70 to 72%
D+	= 67 to 69%
D	= 63 to 66%
D-	= 60 to 62%
E	= <59%

Expectations of students

- Attend all classes, be on time, and actively participate in the class.
- You will be responsible for understanding all the material covered in lecture and that is part of the assignments.
- Complete all assignments.
- Read assigned material. Wider reading is encouraged.
- Submit assignments on time. No late assignments will be accepted.
- Some material that will be presented in class is not in the textbook, so make arrangements to get notes if you are absent from class.

Class Policies

No private conversations or newspaper reading during class will be tolerated.

All cellphones must be silent during class. Please refrain from email/texting during class.

Statement on 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 at <http://studentlife.osu.edu/csc/>.

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.

Tentative Class Schedule

*The following course schedule is a guide, and likely will change as the class evolves. **The exam dates are fixed.***

Date	Day	Class Content	Readings	Assignments
aug. 24	w	syllabus and intro		
aug. 26	f	Introduction to weather and climate		
aug. 29	m	Atmospheric composition and structure	Chapter 1	
aug. 31	w	Atmospheric composition and structure		Assignment #1 handout
sep. 2	f	Forms of energy	Chapter 2	
sep. 5	m	NO CLASS- Labor Day		
sep. 7	w	Energy balance	Chapter 3	Assignment #1 due
sep. 9	f	Energy balance		
sep. 12	m	Spatial and temporal variations		
sep. 14	w	Controls on temperature		Assignment #2 handout
sep. 16	f	Atmospheric humidity	Chapter 5	
sep. 19	m	Spatial and temporal variations		
sep. 21	w	Controls on humidity		Assignment #2 due
sep. 23	f	Condensation: Dew, fog, and clouds	Chapter 6	
sep. 26	m	Dew, fog, and clouds (continued)		
sep. 28	w	Review for Exam #1; Weather notebook		
sep. 30	f	Exam #1		
oct. 3	m	Stability and clouds		
oct. 5	w	Stability and precipitation	Chapter 7	Assignment #3 handout

oct. 7	f	Precipitation		
oct. 10	m	Precipitation		
oct. 12	w	Spatial and temporal variations		Assignment #3 due
oct. 14	f	NO CLASS- Fall Break		
oct. 17	m	Atmospheric pressure and winds	Chapter 4	
oct. 19	w	Atmospheric pressure and winds		
oct. 21	f	Small-scale and local winds		
oct. 24	m	Global systems	Chapter 8	
oct. 26	w	Global systems (continued)		Assignment #4 handout
oct. 28	f	Air masses and fronts	Chapter 9	
oct. 31	m	Middle-latitude cyclones	Chapter 10	
nov. 2	w	Review for Exam #2		Assignment #4 due
nov. 4	f	Exam #2		
nov. 7	m	Weather forecasting	Chapter 13	
nov. 9	w	Thunderstorms	Chapter 11	Weather notebook due
nov. 11	f	NO CLASS- Veterans Day		
nov. 14	m	Thunderstorms		
nov. 16	w	Tornadoes		Assignment #5 handout
nov. 18	f	Hurricanes	Chapter 12	
nov. 21	m	Hurricanes		Assignment #5 due
nov. 23	w	NO CLASS- Thanksgiving		
nov. 25	f	NO CLASS- Thanksgiving		
nov. 28	m	Climate change (Past climates)	Chapter 15	
nov. 30	w	Climate change (The Science)	Chapter 16	Assignment #6 handout
dec. 2	f	Climate change (The Science)		
dec. 5	m	Climate change (Future Impacts)		
dec. 7	w	Last day of class: Review for Final Exam		Assignment #6 due
dec. 15	tr	Final Exam 2-3:45 pm		