



GEOGRAPHY 5900: WEATHER, CLIMATE AND GLOBAL WARMING

Autumn 2020. 3 Units.

Last updated September 9, 2020

Instructor: Dr. Steven Quiring

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Email: quiring.10@osu.edu

Office Hours: Dr. Quiring's online office hours will be held Wednesday and Friday (12:30 to 1:30 pm) and by appointment. All office hours will be virtual (using both Zoom and the chat feature in Carmen):

<https://osu.zoom.us/j/91712777572?pwd=emNpVzhibWpKeDNYN21SVWpOaWFXUT09>

Meeting ID: 917 1277 7572

Password: n5cJnT

If the above times do not work for you, please email me to setup a meeting at a time that works for you.

Teaching Assistant: Alex Ihle (ihle.14@buckeyemail.osu.edu)

Office hours: Alex's office hours will be Tuesday and Thursday (8 to 9 pm) and by appointment. All office hours will be virtual this semester (using both Zoom and the chat feature in Carmen):

<https://osu.zoom.us/j/91659305707?pwd=UTJqZzZUSDcyeFc4dW90cG1sNDBJdz09>

Meeting ID: 916 593 05707

Password: 5q277v

Course description

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.

Course learning outcomes

By the end of this course, students should successfully be able to:

- (1) describe the structure and composition of the atmosphere and how it has changed with time [Goal A; 1a];
- (2) explain the factors that cause variations in solar radiation and the surface energy budget over time and space [Goal A; 1c];
- (3) explain the physical processes leading to the formation of atmospheric features including clouds, precipitation, winds, cyclones and thunderstorms [Goal A; 1c];
- (4) identify and explain environmental issues pertaining to human impacts on the climate system, including global warming [Goal D; 1a and 1b];
- (5) describe the spatial and temporal patterns of global temperature and precipitation [Goal A; 3a], and the physical processes that are responsible for these patterns [Goal A; 3d].

HOW THIS COURSE WORKS

Mode of delivery: This is a distanced enhanced course. That means 74% to 99% of the class will be online. All of the lecture material, reading quizzes, exercises and exams will be online. Students will be required to log into Carmen on a specific date and time to take the 3 exams. All other activities can be completed on Carmen at a time that is convenient for the students (asynchronous).

I will be offering **optional in-person activities** approximately once per month. These ungraded activities will take place during the normal class time. If they want to attend, students will be able to sign up for a specific date and time. These activities will include discussions, Q&A sessions, and hands-on activities that are related to the course content. They are designed to help students learn and apply course concepts. These activities do NOT count towards your grade. Students can choose to participate if they are interested and available.

Pace of online activities: This course is divided into **weekly modules** that are released one week ahead of time. Students are expected to keep pace with weekly deadlines, but may schedule their efforts freely within that time frame.

Credit hours and work expectations: This is a **3-credit-hour course**. According to [Ohio State policy](#), students should expect around 3 hours per week of time spent on direct instruction (instructor content and Carmen activities, for example) in addition to 6 hours of homework (reading and assignment preparation, for example) to receive a grade of (C) average.

Attendance and participation requirements: Because this is a distanced enhanced course, your attendance is based on your online activity and participation. The following is a summary of everyone's expected participation:

- **Participating in online activities for attendance: AT LEAST ONCE PER WEEK**
You are expected to log in to the course in Carmen every week. (During most weeks you will probably log in many times.) If you have a situation that might cause you to miss an entire week of class, discuss it with me *as soon as possible*.
- **Office hours and live sessions: OPTIONAL**
All live, scheduled events for the course, including my office hours, are optional.
- **Participating in reading quizzes and exercises: UP TO 2 TIMES PER WEEK**
A reading quiz will be assigned each week and an exercise will be assigned approximately every other week. These assignments have fixed due dates (See Carmen for all due dates).

COURSE MATERIALS AND TECHNOLOGIES

Textbook

REQUIRED

- Understanding Weather and Climate, 7th Edition (2015), Aguado & Burt, ISBN-13: 9780134113388, 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.

Course technology

For help with your password, university email, Carmen, or any other technology issues, questions, or requests, contact the Ohio State IT Service Desk. Standard support hours are available at ocio.osu.edu/help/hours, and support for urgent issues is available 24/7.

- **Self-Service and Chat support:** ocio.osu.edu/help
- **Phone:** 614-688-4357(HELP)
- **Email:** servicedesk@osu.edu
- **TDD:** 614-688-8743

BASELINE TECHNICAL SKILLS FOR ONLINE COURSES

- Basic computer and web-browsing skills
- Navigating Carmen: for questions about specific functionality, see the [Canvas Student Guide](#).

REQUIRED TECHNOLOGY SKILLS SPECIFIC TO THIS COURSE

- [CarmenZoom virtual meetings](#)
- Completing online quizzes and exams in Carmen. For questions about specific functionality, see the [Canvas Student Guide](#).

REQUIRED EQUIPMENT

- Computer: current Mac (OS X) or PC (Windows 7+) with high-speed internet connection
- Webcam: built-in or external webcam, fully installed and tested
- Microphone: built-in laptop or tablet mic or external microphone
- Other: a mobile device (smartphone or tablet) or landline to use for BuckeyePass authentication

REQUIRED SOFTWARE

- [Microsoft Office 365](#): All Ohio State students are now eligible for free Microsoft Office 365 ProPlus through Microsoft's Student Advantage program. Full instructions for downloading and installation can be found [at go.osu.edu/office365help](https://go.osu.edu/office365help).

CARMEN ACCESS

You will need to use [BuckeyePass](#) multi-factor authentication to access your courses in Carmen. To ensure that you are able to connect to Carmen at all times, it is recommended that you take the following steps:

- Register multiple devices in case something happens to your primary device. Visit the [BuckeyePass - Adding a Device](#) help article for step-by-step instructions.
- Request passcodes to keep as a backup authentication option. When you see the Duo login screen on your computer, click **Enter a Passcode** and then click the **Text me new codes** button that appears. This will text you ten passcodes good for 365 days that can each be used once.
- Download the [Duo Mobile application](#) to all of your registered devices for the ability to generate one-time codes in the event that you lose cell, data, or Wi-Fi service.

If none of these options will meet the needs of your situation, you can contact the IT Service Desk at 614-688-4357 (HELP) and IT support staff will work out a solution with you.

GRADING AND FACULTY RESPONSE

How your grade is calculated

Your grade will be based on three parts:

Reading Quizzes (best 12 will count)	20%
Exercises (best 7 will count)	20%
Exams (3; each worth 20%)	60%

See course schedule below for due dates.

Reading Quizzes. There is a reading quiz that is due at the beginning of each week (due Monday at 11 pm). Each quiz will be administered through Carmen and it has ~10 questions that are based on the chapter you were assigned to read. These quizzes are assigned to encourage you to keep up with reading the textbook. **There are no makeups for missed reading quizzes and late submissions are not accepted. Please refer to Carmen for due dates.** This is an individual assignment. There are 14 reading quizzes that will be assigned during the semester. You will get credit for the best 12 scores. Therefore, if you miss a reading quiz for any reason (you were ill, you forgot, you were away, etc.), a makeup will not be offered. This will be one of the lowest grades that will be dropped. This gives equal treatment to everyone in the class. No additional makeups/extensions/do overs will be provided.

Exercises. The exercises will require you to apply what you learn in this class. All exercises will be administered through Carmen. They are due at the end of the week (due Friday at 11 pm). These are individual assignments and each student must submit their own work. However, you may discuss the questions and work collaboratively. **There are no makeup**

exercises and late submissions are not accepted. Please refer to Carmen for due dates. There are 8 exercises that will be assigned during the semester. You will get credit for the best 7 scores.

Exams. Examinations will be administered online through Carmen. All students will take the exams at the same time. This is an individual assignment. You are not allowed to discuss the questions with anyone. The exam is open book and open notes. Therefore, you can look at the textbook and your notes to answer the questions. The exams have been scheduled during our normal class time.

- **Exam 1** (Wednesday, September 30, 12:40-1:30 pm ET) will test all topics covered since the start of the semester.
- **Exam 2** (Friday, October 30, 12:40-1:30 pm ET) will test all topics covered since Exam 1.
- **Exam 3** (Friday, December 4, 12:40-1:30 pm ET) will test all topics covered since Exam 2.

*You must be available on the date and time scheduled for these exams. They are being held during the regular class time of this class, so you should not have any conflicts. I am letting you know at the start of the semester so that you can arrange your schedule accordingly. 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.*

Grading scale

93–100: A
 90–92.9: A-
 87–89.9: B+
 83–86.9: B
 80–82.9: B-
 77–79.9: C+
 73–76.9: C
 70 –72.9: C-
 67 –69.9: D+
 60 –66.9: D
 Below 60: E

Instructor feedback and response time

I am providing the following list to give you an idea of my intended availability throughout the course. (Remember that you can call **614-688-HELP** at any time if you have a technical problem.)

- **Grading and feedback:** Reading quizzes, exercises and exam grades will be released once everyone has completed the assignment. This will typically be within 7 days.
- **Email:** The TA and I will do our best to reply to emails within 24 hours on days when class is in session at the university.

OTHER COURSE POLICIES

Academic integrity policy for this class

- **Reading Quizzes:** This is an individual assignment. There are no makeups for missed reading quizzes and late submissions are not accepted. Please refer to Carmen for due dates. There are 14 reading quizzes that will be assigned during the semester. You will get credit for the best 12 scores.
- **Exercises:** These are individual assignments and each student must submit their own exercise. However, you may discuss the questions and work collaboratively. **There are no makeup exercises and late submissions are not accepted. Please refer to Carmen for due dates.** There are 8 exercises that will be assigned during the semester. You will get credit for the best 7 scores.
- **Exams:** You must complete the 3 exams yourself, without any external help or communication. You are not allowed to discuss the questions with anyone. The exam is open book and open notes. Therefore, you can look at the textbook and your notes to answer the questions.

OHIO STATE'S ACADEMIC INTEGRITY POLICY

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 I recommend that you review the *Code of Student Conduct* and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by university rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the university's *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 from the university.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Other sources of information on academic misconduct (integrity) to which you can refer include:

- The Committee on Academic Misconduct web pages ([COAM Home](#))
- *Ten Suggestions for Preserving Academic Integrity* ([Ten Suggestions](#))
- *Eight Cardinal Rules of Academic Integrity* (www.northwestern.edu/uacc/8cards.htm)

Copyright disclaimer

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

Statement on Title IX

All students and employees at Ohio State have the right to work and learn in an environment free from harassment and discrimination based on sex or gender, and the university can arrange interim measures, provide support resources, and explain investigation options, including referral to confidential resources.

If you or someone you know has been harassed or discriminated against based on your sex or gender, including sexual harassment, sexual assault, relationship violence, stalking, or sexual exploitation, you may find information about your rights and options at titleix.osu.edu or by contacting the Ohio State Title IX Coordinator at titleix@osu.edu. Title IX is part of the Office of Institutional Equity (OIE) at Ohio State, which responds to all bias-motivated incidents of harassment and discrimination, such as race, religion, national origin and disability. For more information on OIE, visit equity.osu.edu or email equity@osu.edu.

Your mental health

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you find yourself feeling isolated, anxious or overwhelmed, please know that there are resources to help: ccs.osu.edu. You can reach an on-call counselor when CCS is closed at (614) 292-5766 and 24 hour emergency help is also available through the 24/7 National Prevention Hotline at 1-(800)-273-TALK or at suicidepreventionlifeline.org. The Ohio State Wellness app is also a great resource available at go.osu.edu/wellnessapp.

ACCESSIBILITY ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

Requesting accommodations

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. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. 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; 098 Baker Hall, 113 W. 12th Avenue.

Accessibility of course technology

This online course requires use of Carmen (Ohio State's learning management system) and other online communication and multimedia tools. If you need additional services to use these technologies, please request accommodations with your instructor.

- [CarmenCanvas accessibility](#)
- [CarmenZoom accessibility](#)

COURSE SCHEDULE

Date	Day	Class Content	Readings	Exercises	Week
Aug. 26	W	Syllabus and intro			1
Aug. 28	F	Introduction to climate change			1
Aug. 31	M	Climate change (The Science)	Chapter 16	Reading quiz 1	2
Sep. 2	W	Climate change (Future Impacts)	Chapter 16		2
Sep. 4	F	Climate change (Future Impacts)	Chapter 16		2
Sep. 7	M	NO CLASS- Labor Day	Chapter 1	Reading quiz 2	3
Sep. 9	W	Introduction to the atmosphere	Chapter 1		3
Sep. 11	F	Atmospheric structure	Chapter 1	Exercise #1	3
Sep. 14	M	Forms of energy	Chapter 2	Reading quiz 3	4
Sep. 16	W	Forms of energy	Chapter 2		4
Sep. 18	F	Earth-Sun relationships	Chapter 2	Exercise #2	4
Sep. 21	M	Energy balance	Chapter 3	Reading quiz 4	5
Sep. 23	W	Energy balance	Chapter 3		5
Sep. 25	F	Energy balance	Chapter 3	Exercise #3	5
Sep. 28	M	Controls on temperature	Chapter 3	Reading quiz 5	6
Sep. 30	W	Exam #1 (all students will take exam online: 12:40-1:30 ET, Sept. 30)			6
Oct. 2	F	Atmospheric humidity	Chapter 5		6
Oct. 5	M	Controls on humidity	Chapter 5	Reading quiz 6	7
Oct. 7	W	Condensation: Dew, fog, and clouds	Chapter 5		7
Oct. 9	F	Dew, fog, and clouds (continued)	Chapter 5	Exercise #4	7
Oct. 12	M	Stability and clouds	Chapter 6	Reading quiz 7	8
Oct. 14	W	Stability and clouds	Chapter 6		8
Oct. 16	F	Stability and precipitation	Chapter 6		8
Oct. 19	M	Precipitation	Chapter 7	Reading quiz 8	9
Oct. 21	W	Precipitation	Chapter 7		9
Oct. 23	F	Precipitation	Chapter 7	Exercise #5	9
Oct. 26	M	Atmospheric pressure and winds	Chapter 4	Reading quiz 9	10
Oct. 28	W	Atmospheric pressure and winds	Chapter 4		10
Oct. 30	F	Exam #2 (all students will take exam online: 12:40-1:30 ET, Oct. 30)			10
Nov. 2	M	Global systems	Chapter 8	Reading quiz 10	11
Nov. 4	W	Global systems	Chapter 8		11
Nov. 6	F	Global systems	Chapter 8	Exercise #6	11

Nov. 9	M	Air Masses & Fronts	Chapter 9	Reading quiz 11	12
Nov. 11	W	NO CLASS- Veterans Day			12
Nov. 13	F	Mid-latitude cyclones	Chapter 10	Exercise #7	12
Nov. 16	M	Hurricanes/Tropical Cyclones	Chapter 12	Reading quiz 12	13
Nov. 18	W	Hurricanes/Tropical Cyclones	Chapter 12		13
Nov. 20	F	Hurricanes/Tropical Cyclones	Chapter 12	Exercise #8	13
Nov. 23	M	Thunderstorms	Chapter 11	Reading quiz 13	14
Nov. 25	W	Tornadoes	Chapter 11		14
Nov. 27	F	NO CLASS- Thanksgiving			14
Nov. 30	M	Weather forecasting	Chapter 13	Reading quiz 14	15
Dec. 2	W	Weather forecasting	Chapter 13		15
Dec. 4	F	Exam #3 (all students will take exam online: 12:40-1:30 ET, Dec. 4)			15