GEOGRAPHY 5900: WEATHER, CLIMATE AND GLOBAL WARMING

Autumn 2025. 3 Units.
Last updated August 26, 2025

Instructor: Dr. Steven Quiring
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Office Hours: Dr. Quiring's office hours will be held Wednesday (9 to 10:30 am), Thursday (3:30 to 5 pm) and by appointment. You can attend office hours in person (1062 Derby Hall) or virtually (using Zoom):

https://osu.zoom.us/j/92723388349?pwd=VCd90BBiiHVNXfBcedkS1F5fOIy8Ia.1

Meeting ID: 927 2338 8349
Password: 482657

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: Cris Kubatko (kubatko.6@buckeyemail.osu.edu)
Office hours: office hours will be Tuesday (2 to 3 pm), Thursday (2 to 3 pm) and by appointment. You can attend office hours virtually (using Zoom):
https://us05web.zoom.us/j/7479698554?pwd=Zgb8WA2KuSL3eXzqO1xxpxS9qb4j9a.1

Prerequisites

None.

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;

(2) explain the factors that cause variations in solar radiation and the surface energy budget over time and space;

(3) explain the physical processes leading to the formation of atmospheric features including clouds, precipitation, winds, cyclones and thunderstorms;

(4) identify and explain environmental issues pertaining to human impacts on the climate system, including global warming;

(5) describe the spatial and temporal patterns of global temperature and precipitation, and the physical processes that are responsible for these patterns.

HOW THIS COURSE WORKS

Mode of delivery: This is a distance learning course. The lectures, reading quizzes, exercises and exams will be online. They can be completed on Carmen at a time that is convenient for the students (asynchronous).

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

Communication: I will communicate regularly with students via Carmen class announcements and weekly emails. These communications will provide reminders of the topics for the week and upcoming deadlines.

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 an online course, your attendance is based on your online activity and participation. The following is a summary of students' expected participation:

- **Participating in online activities**: **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**: **OPTIONAL**
  My office hours and the TA office hours are optional. They are available for students who have questions about the course content and assignments (or you can just stop by if you want to say hi).
- **Question and Answer Forum**: **OPTIONAL**
  I will create a Q&A discussion forum on Carmen for students who have questions about the course content and assignments. This will be beneficial for students who can't attend office hours, or just have a quick question.
- **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).
- **Online review sessions**: **OPTIONAL**

  I will hold a live review session before each of the exams. During this session I will summarize the format and content that will be on the exam. I will also provide students with the opportunity to ask questions about the exam content. These sessions will be recorded for those who are unable to attend.

COURSE MATERIALS AND TECHNOLOGIES

Textbook

REQUIRED

- Understanding Weather and Climate, 7th Edition (2015), Aguado & Burt, ISBN-13: 9780134113388, Pearson.
- Every student registered in this class will be provided with an electronic copy of the textbook through Access Pearson

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 (MacOs) or PC (Windows 10) 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) 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.

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 (go.osu.edu/add-device).
- 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 (go.osu.edu/install-duo) 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)	15%
Exercises (best 7 will count)	25%
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. However, you are **not permitted** to use any generative AI tools to answer the exam questions. The exams will be posted for a 24-hour period. They are timed and you will have 55 minutes to complete the exam. Once you answer a question, you will not have the ability to go back and change your response.

*You must be available on the date scheduled for these exams. 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

To maintain a culture of integrity and respect, generative AI tools should not be used in the completion of any reading quizzes, exercises or exams.

- **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. The reading quizzes each contain ~10 multiple choice questions.

- **Exercises**: This is an individual assignment 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. The exercises are comprised of multiple choice, ranking and matching questions. They require you to apply the knowledge and concepts covered in the lectures. For example, you may be asked to identify the type of front that is shown on a map, or to choose the correct weather forecast for a location.

- **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. Each exams has 40 multiple choice questions. **Please refer to Carmen for the exam dates.**

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 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.

Artificial Intelligence and Academic Integrity

There has been a significant increase in the popularity and availability of a variety of generative artificial intelligence (AI) tools, including ChatGPT, Sudowrite, and others. These tools will help shape the future of work, research and technology, but when used in the wrong way, they can stand in conflict with academic integrity at Ohio State.

All students have important obligations under the Code of Student Conduct to complete all academic and scholarly activities with fairness and honesty. Our professional students also have the responsibility to uphold the professional and ethical standards found in their respective academic honor codes. Specifically, students are not to use unauthorized assistance in the laboratory, on field work, in scholarship, or on a course assignment unless such assistance has been authorized specifically by the course instructor. In addition, students are not to submit their work without acknowledging any word-for-word use and/or paraphrasing of writing, ideas or other work that is not your own. These requirements apply to all students undergraduate, graduate, and professional.

To maintain a culture of integrity and respect, generative AI tools should not be used in the completion of course assignments.

Religious Accommodations

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.

Policy: Religious Holidays, Holy Days and Observances

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.

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 or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life's Counseling and Consultation Service (CCS) by visiting ccs.osu.edu or calling 614-292-5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on call counselor when CCS is closed at 614-292-5766 and 24 hour emergency help is also available 24/7 **by dialing 988 to reach the Suicide and Crisis Lifeline**.

ACCESSIBILITY ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

Requesting accommodations

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.

slds@osu.edu
https://slds.osu.edu/
098 Baker Hall, 113 W. 12th Ave
614-292-3307 phone

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

This course is divided into **weekly modules** that are released one week ahead of time. You are expected to keep pace with weekly deadlines, but you may schedule your efforts freely within this time frame. For convenience, I have divided into the class content and readings into 2-3 days per week. The due dates for the exercises and reading quizzes are shown below.

Date	Day	Class Content	Readings	Assignments	Week
Aug. 27	W	Syllabus and intro			1
Aug. 29	F	Introduction to climate change			1
Sep. 1	M		Chapter 16	Reading quiz 1	2
Sep. 3	W	Climate change: The Science	Chapter 16		2
Sep. 5	F	Climate change: Future Impacts	Chapter 16		2
Sep. 8	M		Chapter 1	Reading quiz 2	3
Sep. 10	W	Introduction to the atmosphere	Chapter 1		3
Sep. 12	F	Atmospheric structure	Chapter 1	Exercise #1	3
Sep. 15	M		Chapter 2	Reading quiz 3	4
Sep. 17	W	Solar radiation	Chapter 2		4
Sep. 19	F	Earth-Sun relationships and the seasons	Chapter 2	Exercise #2	4
Sep. 22	M		Chapter 3	Reading quiz 4	5
Sep. 24	W	Energy balance (part 1)	Chapter 3		5
Sep. 26	F	Controls on temperature	Chapter 3	Exercise #3	5
Sep. 29	M	EXAM #1 REVIEW SESSION (Sep. 29; 3 to 4 pm)	Chapter 3	Reading quiz 5	6
Oct. 1	W	**Exam #1 (all students will take exam online on Oct. 1; open from 12:01 am to 11:59 pm)**			6
Oct. 3	F	Atmospheric humidity	Chapter 5		6
Oct. 6	M		Chapter 5	Reading quiz 6	7
Oct. 8	W	Controls on humidity	Chapter 5		7

Oct. 10	F	Condensation: Dew, fog, and clouds	Chapter 5	Exercise #4	7
Oct. 13	M		Chapter 6	Reading quiz 7	8
Oct. 15	W	Stability and clouds	Chapter 6		8
Oct. 17	F	**Fall Break**			8
Oct. 20	M		Chapter 7	Reading quiz 8	9
Oct. 22	W	Precipitation (part 1)	Chapter 7		9
Oct. 24	F	Precipitation (part 2)	Chapter 7	Exercise #5	9
Oct. 27	M	Atmospheric pressure and winds	Chapter 4	Reading quiz 9	10
Oct. 29	W	EXAM #2 REVIEW SESSION (Oct. 29; 9 to 10 am)	Chapter 4		10
Oct. 31	F	**Exam #2 (all students will take exam online on Oct. 31; open from 12:01 am to 11:59 pm)**			10
Nov. 3	M		Chapter 8	Reading quiz 10	11
Nov. 5	W	Global systems (part 1)	Chapter 8		11
Nov. 7	F	Global systems (part 2)	Chapter 8		11
Nov. 10	M		Chapter 9	Reading quiz 11	12
Nov. 12	W	Air Masses & Fronts	Chapter 9		12
Nov. 14	F	Mid-latitude cyclones	Chapter 10	Exercise #6	12
Nov. 17	M		Chapter 12	Reading quiz 12	13
Nov. 19	W	Hurricanes/Tropical Cyclones (part 1)	Chapter 12		13
Nov. 21	F	Hurricanes/Tropical Cyclones (part 2)	Chapter 12	Exercise #7	13
Nov. 24	M	Thunderstorms	Chapter 11	Reading quiz 13	14
Nov. 26	W	**Thanksgiving**			14
Nov. 28	F	**Thanksgiving**			14
Dec. 1	M		Chapter 13	Reading quiz 14	15
Dec. 3	W	Tornadoes	Chapter 11		15
Dec. 5	F	Weather forecasting	Chapter 13	Exercise #8	15
Dec. 8	M	EXAM #3 REVIEW SESSION (Dec. 8; 9 to 10 AM)			16
Dec. 10	W	**Exam #3 (all students will take exam online on Dec. 10; open from 12:01 am to 11:59 pm)**			16