

GEOG 5900, CLIMATOLOGY
Spring Semester 2023, 3 units, Call number: 27560/27559
Lectures: TuTh 12:45-2:05 PM, McPherson Lab 2017

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Textbook: "Atmospheric Science: An Introductory Survey" (2nd ed.) by John M. Wallace and Peter V. Hobbs, published by Academic Press. (Ordered at the OSU bookstores)

Carmen Canvas will be used as the course website, with lecture powerpoint files, reference materials, announcements and grades all posted there. All the assignments will be submitted to Carmen.

Course Objectives:

This course is designed to provide a broad introduction to *climatology*, the study of the average state of weather on planet Earth. Emphasis is made of planetary energy budgets, regional climates, climate change, and past and future climates. Energy budgets include the solar energy receipt, infrared radiation loss, turbulent heat fluxes, and the 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 humankind has both intentionally and unintentionally become a factor in the physical processes of weather and climate. Many students will find the basic concepts and ideas discussed in the course will have applications in their fields of interest as well as applications to their daily lives.

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.

Methods for accomplishing these objectives:

The objectives of the course will be accomplished through the lectures, homework/assignments, in-class presentations, and examinations. The lectures will include some material not covered in the textbook and may incorporate math to the level of algebra. Determination of your grade will be as follows:

Pop quizzes or attendance check (11 total – will drop your worst score)	10%
Homeworks (11 total – will drop your worst score)	40%
Weather diary (60 days)	10%
Three midterm exams (20% each, will drop your worst score)	40%
• All exams will be multiple-choice. Midterms are not cumulative.	

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

Please note

- Lecture notes will be posted on the course website. The latest version is generally posted by noon the day of the lecture.
- The grading policy is very forgiving: we will drop your worst scores from every category. We also give a bonus assignment which increase 10% of your final grades. **Therefore no make-up, curve, or round-up will be given for labs, quizzes, exams or final grades.**
- **Absence and make-up: An official letter from your supervisor or a doctor's note is required to excuse any absence. Please give the letter to your TA to arrange for a make-up.**
- **The TA has the full authority for grading the homeworks.** The homeworks constitute a relatively independent component of the course. **Any question about the homeworks should be directed to the TA.** Homeworks should be turned in to Carmen.
- **Late assignments will not be accepted.**

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 (http://studentaffairs.osu.edu/info_for_students/csc.asp).

Disability Services Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated, and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; <http://www.ods.ohio-state.edu/>.

Cell Phones Like on airplanes, interfere with navigation of the course, therefore, cell phones and pagers must be turned *OFF* during class as they interfere with the navigation of the course.

Some Tips for Doing Well:

1. Pay special attention to the “Review of last lecture” slide at the beginning of class and the “Summary” slide at the end of class. Those are the materials you need to remember, and will be asked about in exams.
2. Check the course website frequently for updates.
3. Enjoy the weather diary.
4. Relax and have fun.

Final Exam: No final exam

The schedule may change, probably only slightly, as the class evolves. Instructor will alert students if/when schedule changes.

COURSE LECTURE OUTLINE

Date	LECTURE
01/10	Syllabus and course introduction
01/12	Overview
01/17	Overview
01/19	Overview
01/24	Composition of the Atmosphere
01/26	Energy
01/31	Energy
02/02	Temperature
02/07	Pressure and Winds
02/09	Global Circulation
02/14	Midterm 1 Review
02/16	MIDTERM 1
02/21	Global water cycle
02/23	Global water cycle
02/28	Global water cycle
03/02	Convective Systems
03/07	Convective Systems
03/09	Convective Systems
03/14	Spring Break (NO CLASS)
03/16	Spring Break (NO CLASS)
03/21	Midterm 2 Review
03/23	MIDTERM 2
03/28	Tropical Cyclones
03/30	Extratropical Cyclones
04/04	Global Climate System
04/06	Global Climate Change
04/11	Global Climate Change (Weather Diary due)
04/13	Global Climate Change
04/18	Midterm 3 Review
04/20	MIDTERM 3