

Geog 1900, Extreme Weather and Climate
Spring Semester 2015, 4 units, Call number: 18758
Lectures: MWF 10:20-11:15 AM, 209 W 18th Ave 160

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Textbook: "Understanding Weather and Climate" (6th ed.) by E. Aguado and J. Burt, published by Prentice Hall. (has been ordered at the OSU bookstores. Note that the 3rd, 4th, and 5th editions of this book are available cheaply from Amazon.com and are virtually identical to the 6th edition. Use one of them instead.)

Recommended: "The Weather Wizard's 5-Year Weather Diary", by Louis D. Rubin Sr., Jim Duncan, and Hiram J. Herbert, published by Algonquin Books of Chapel Hill.

Lab Manual: Ready for purchase at the OSU Bookstore (Barnes and Noble High St.)

Course website: <http://lightning.sbs.ohio-state.edu/geog1900/index.htm>

Course Objectives:

The primary objective of this course is to introduce you to the nature of the atmosphere and the processes by which it operates to produce weather and the distribution of the climates of the earth. As part of the course we will explain the physical processes acting in the earth-atmosphere system and describe its weather features and climatic characteristics. This will involve understanding concepts such as energy receipt, loss, and redistribution in the earth-atmosphere system as well as the understanding of the role of atmospheric moisture in energy exchange as well as cloud and precipitation formation. Course lectures will describe the causes of atmospheric storms that are constantly occurring on a variety of spatial scales, including wave cyclones,

hurricanes, thunderstorms and tornadoes. The physical causes of, and spatial variation 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 distribution of past climates, methods for reconstructing them and potential explanations for them will be discussed. The course will also consider how mankind has both intentionally and unintentionally become a factor in the physical processes of weather and climate. The course will provide you with a sense of the ways in which scientists study the atmosphere, including some of the methodologies they use and the tools and techniques that they employ.

This course is a Natural Science (Physical Science) course in the University General Education Curriculum (GEC). Courses in natural sciences foster an understanding of the principles, theories, and methods of modern science, the relationship between science and technology, the implications of scientific discoveries and the potential of science and technology to address problems of the contemporary world. As part of this natural science course, the learning objectives are to (1) understand the basic facts, principles, theories and methods of modern science, (2) understand key events in the development of science and recognize that science is an evolving body of knowledge, (3) learn of the inter-dependence of scientific and technological developments, and (4) recognize social and philosophical implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world. Many students will find that the basic concepts and ideas discussed in the course will have applications toward their fields of interest as well as applications in their daily lives.

Methods for accomplishing these objectives:

The objectives of the course will be accomplished through the lectures, laboratory assignments, pop quizzes, 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:

Laboratory assignments (11 total – will drop your worst score)	30%
Attendance and Pop quizzes (10 total – will drop your worst score)	20%
Three midterms (25% each – will drop your worst score)	50%
• All exams will be multiple-choice.	
(Bonus) Weather diary (60 days)	10%

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

- A large portion of the materials that appear on the midterm and final exams will be covered in lecture only. Therefore, *you are highly encouraged to attend all classes or your final grade will suffer*.
- The grading policy is very forgiving: we will drop your worst scores from every category. Therefore no make-up will be given for labs, quizzes or exams. **The only exception is when you have an official letter from your supervisor or a doctor to excuse your absence. Please give the letter to your TA to arrange for a make-up.**
- Lab assignments should be turned in to the TAs. Late papers will not be accepted.
- Lecture notes will be posted on the course website.

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, cell phones 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. Attend classes – A large portion of the materials that appear on the midterm exams will be covered in lecture only.
2. Pay special attention to the “Review of last lecture” slide at the beginning of each class and the “Summary” slide at the end of class. Those are the materials you need to remember, and will be asked about in the exams.
3. Check the course website frequently for updates.
4. Write the weather diary.
5. 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 schedule

(see course website: <http://lightning.sbs.ohio-state.edu/geog1900/index.htm>)

COURSE LECTURE OUTLINE

Date	LECTURE
01/12	Syllabus and course introduction
01/14	Overview I: Extreme weather and climate
01/16	Overview II: Success and failure of weather and climate prediction
01/19	Martin Luther King Day (NO CLASS)
01/21	Overview III: Why is it so difficult to predict weather and climate?
01/23	Evolution of the Earth's atmosphere
01/26	The ice ages and glacial cycles
01/28	The incoming solar energy
01/30	What causes the four seasons?
02/02	What is the Greenhouse Effect?
02/04	Vertical Structure of the atmosphere
02/06	What set the atmosphere in motion?
02/09	How does air move around the globe?
02/11	Midterm 1 Review
02/13	MIDTERM 1
02/16	The global water cycle
02/18	Dew, frost and fogs
02/20	How do the clouds form?
02/23	Why does it rain on us?
02/25	Formation of snow and hails
02/27	Lightning
03/02	Thunderstorms
03/04	Twisters
03/06	Mesoscale convective systems
03/09	Downbursts and dust storms
03/11	Midterm 2 Review
03/13	MIDTERM 2
03/16	Spring break (NO CLASS)
03/18	Spring break (NO CLASS)
03/20	Spring break (NO CLASS)
03/23	Where do the hurricanes come from?
03/25	How do the hurricanes amplify?
03/27	Airmasses and Fronts
03/30	How do the blizzards form?
04/01	What are the El Nino and La Nina?
04/03	Extratropical climate

04/06 How do we predict weather and climate?
04/08 The heat island effect
04/10 Air pollution

04/13 Is there really a global warming happening?
04/15 Feedbacks for climate change
04/17 Abrupt climate change (**Weather Diary due**)

04/20 How will the climate likely be at the end of this century?
04/22 Mitigation of global climate change
04/24 Midterm 3 Review

04/27 MIDTERM 3
04/29 Final week (NO CLASS)
05/01 NO FINAL EXAM