

**GEOG 5900, CLIMATOLOGY**  
**Autumn 2014, 3 units, call number: 19458/19478**  
**MW 9:10 AM – 10:05 AM, Derby Hall 0080**  
**F 9:10 AM – 10:05 AM, Derby Hall 0140**

**Instructor:** Dr. Jialin Lin

**Email:** lin.789@osu.edu This is the best way to reach me.

**Telephone:** 614-292-6634

**Office:** 1128 Derby Hall

**Office Hours:** Monday and Wednesday 10:45am-11:45am, or by appointment

**Teaching Assistant and Instructor for Labs:** Robert Brewer

**Email:** brewer.219@osu.edu

**Telephone:** 292-9552

**Office:** Derby Hall 1174

**Office Hours:** Monday 12:00pm-2:00pm & Wednesday 10:30am-12:30pm, or by appointment

**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.)

**Course website** <http://lightning.sbs.ohio-state.edu/geog5900/index.htm>

**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 21<sup>st</sup> 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:

Homework or in-class assignments (one per week – 10 total – will drop your worst score)	25%
Pop quizzes or attendance check (11 total – will drop your worst score)	10%
One in-class presentation	20%
Three midterm exams (22.5% each, will drop your worst score)	45%
• 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 exams will be covered in lecture only. Therefore, *you are strongly 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 a doctor's note or an official letter from your supervisor to excuse your absence. Please give the letter to the instructor to arrange for a make-up.
- Homework and assignments should be turned in to the TA. Late papers will not be accepted.
- The in-class presentation can be on *any topics that you are interested in* and are related to weather, climate or climate change, which is designed to encourage your independent thinking and enhance your ability to do an independent research. Attendance is required for all in-class presentations.
- Lecture notes will be posted on the course website.

The in-class presentation can be on *any topics that you are interested in* and are related to weather, climate or climate change, which is designed to encourage your independent thinking and enhance your ability to do an independent research. Attendance is required for all in-class presentations and will count for 10% of your final grade (can improve your grade from C to B or from B to A!).

**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](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. Attend classes – 50% of your grade is based on in-class assignments and attendance/participation. **If you attend all classes and finish all the homework/assignments, you will likely do well on the exams.**
2. 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.
3. Actively participate in the in-class presentations and discussions.
4. Check the course website frequently for updates.
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 LECTURE OUTLINE

<u>Date</u>	<u>LECTURE</u>
08/27	Syllabus and course introduction
08/29	Introduction to in-class presentations and weather diary
09/01	Labor Day (NO CLASS)
09/03	Visit Byrd Polar Research Center
09/05	In-class assignment I: Ice Man – The story of Lonnie Thompson Sign-up for in-class presentation
09/08	Atmospheric Sciences at a Glance (1)
09/10	Atmospheric Sciences at a Glance (2)
09/12	In-class assignment II: Melting of Greenland's ice sheet
09/15	Evolution of the atmosphere
09/17	The incoming solar radiation
09/19	In-class presentation 1
09/22	The greenhouse effect
09/24	Vertical Structure of the atmosphere
09/26	In-class presentation 2 HW#1: Atmospheric sounding
09/29	Atmospheric pressure and winds
10/01	General circulation
10/03	In-class presentation 3 HW#2: General circulation of the atmosphere
10/06	Midterm 1 Review
10/08	MIDTERM 1
10/10	In-class presentation 4
10/13	Atmospheric moisture and clouds
10/15	Precipitation
10/17	In-class presentation 5 HW#3: Atmospheric water vapor and clouds
10/20	Midlatitude cyclones
10/22	Thunderstorms and lightning
10/24	In-class presentation 6 HW#4: Rainfall associated with major floods in U.S.
10/27	Tornadoes
10/29	Mesoscale convective systems and downbursts
10/31	In-class presentation 7 HW#5: Tornado climatology
11/03	Midterm 2 Review
11/05	MIDTERM 2
11/07	In-class presentation 8

- HW#6: Global precursors of flooding seasons in southwest U.S.
- 11/10 Tropical cyclones  
11/12 Tropical and extratropical climate  
11/14 In-class presentation 9  
HW#7: Aircraft penetration of Hurricane Rita
- 11/17 Observed climate change  
11/19 Projected climate change  
11/21 In-class presentation 10  
HW#8: The debate on the relationship between hurricanes and global warming
- 11/24 In-class presentation 11  
11/26 Thanksgiving Break (NO CLASS)  
11/28 Columbus Day (NO CLASS)
- 12/01 Midterm 3 Review  
12/03 In-class presentation 12  
12/05 MIDTERM 3
- 12/08 Backup  
12/17 **NO FINAL EXAM**