Geography 5900. Weather, Climate and Global Warming.
Autumn Semester 2015. 3 Units.

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General Information:

Lectures: Monday, Wednesday, and Friday 12:40 p.m. – 1:35 p.m., Ramseyer 100.

Required Textbook: **"Meteorology Today: An introduction to weather, climate, and the environment" by C. Donald Ahrens and Robert Henson, 11th Edition, Cengage Learning, 2016, 586 pp. ISBN-13: 978-1-305-11358-9.**

Note: A much cheaper alternative than the hardback book is the loose-leaf version **ISBN-13:978-1-305-26500-4**. You can use an earlier editions of the textbook to save even more money, but it is **your responsibility** to resolve any discrepancy between different editions. Material will be assigned based upon the 11th edition of the textbook.

Class Website: http://polarmet.osu.edu/class/geog5900_2015au/ (password protected)

Grading:

Your grade will be based on **five parts**: take-home assignments, in class exercises, a weather notebook, two mid-term exams, and a final exam. The parts will contribute 15%, 9%,16%, 20%, 20%, and 20%, respectively, to the final grade. There will be 5 *take-home assignments* (worth 3% each) for a total of 15%. These will be given out in hard copy form in class (see Class Outline for dates), and must be handed in during class on the due date specified (typically two weeks after hand out). The 6 in-class exercises are worth 1.5% each for a total of 9%. The *weather notebook* project will run in October, and will be worth 16% of the final grade. The two mid-term exams will be given in class. The final exam is **Thursday December 17, 2:00pm-3:45pm** in the lecture location. The grading scale is: 100-93% A, 92-90% A-, 89-87% B+, 86-83% B, 82-80% B-, 79-76% C+, 75-72% C, 71-68% C-, 67-64% D+, 63-60% D, 59% and below E.

Course Objectives:

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. A basic 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 mankind 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 the 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 energy variations on earth and be able to describe the 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 "global warming", and ozone depletion; and (6) be able to describe the general distribution on the world of temperature, and precipitation – and the physical mechanisms that cause these distributions to occur.

Examinations:

The examinations will consist of multiple-choice questions with the answers entered on Scantron sheets. The material to be covered in the mid-term examinations is given below in the *Course Outline*. **Midterm 1** (***Wednesday September 30,*** in class) will test all topics covered before **September 28**. **Midterm 2** (***Wednesday November 4,*** in class) will test all topics covered during **October**. The final exam (***Thursday December 17, 2:00-3:45 pm***) will cover the course content **after** the Midterm 2. The exams will be held in the same room as the lecture (Ramseyer 100).

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 at least ONE week prior to any exam to be considered for a make-up exam.

Expectations of students:

- Attend all classes, be on time, and actively participate in the class.
- Complete all examinations in the allotted time. You will be responsible for understanding all the lecture material and that given as part of assignments.

- Complete all assignments.
- Read all assigned material. Wider reading is encouraged.
- Keep up with the class to avoid any last minute panics. Remember only 60% of the grade comes from exams.
- Some material will be presented in class that is not in the textbook, so make arrangements to get this if you are absent.

Class Policies:

No private conversations or newspaper reading during class will be tolerated.

All cellphones and pagers must be OFF during class.

Academic misconduct or any other conduct prohibited by the Code of Student Conduct (http://studentaffairs.osu.edu/pdfs/csc_12-31-07.pdf) will not be tolerated, and will be reported to the University's committee on academic misconduct.

Any student needing special consideration as a result of a disability must inform the instructor at the beginning of the class. Documentation must be presented in a timely manner. All necessary accommodations will be made. Contact Office of Student Life Disability Services, 150 Pomerene Hall, 1760 Neil Ave., at 292-3307 for information (http://www.ods.ohio-state.edu/).

Contacting me:

I am available to help by appointment; please ask. Contact details are given at the top of the syllabus. Good luck!

------ David Bromwich, Instructor, August 26, 2015

Course Outline:
The following is a guide, and likely will change as the class evolves. **The examination dates are fixed**.

Day/date	Lecture	Textbook Reading	Week
August			
W, 26	Syllabus Discussion plus		1
	Atmospheric composition and structure	3-12	
F, 28	Structure continued, weather and climate	12-27	
M, 31	Weather and climate (continued)	ditto	2
September			
W, 02	Forms of energy	32-47	
F, 04	Energy balance, A1	47-55	
M, 07	**Labor Day Holiday No class**		3
W, 09	***In-class exercise***		
F, 11	Seasonal and daily temperature variations	60-75	
M, 14	Controls on temperature and measurement	75-89	4
W, 16	***In-class exercise***		
F, 18	Atmospheric humidity, A2	94-111	
M, 21	Condensation: Dew, fog, and clouds	116-142	5
W, 23	***In-class exercise***		
F, 25	Dew, fog, and clouds (continued)	ditto	
M, 28	Review for Midterm 1		6
W, 30	**Midterm 1**		
October (Weather Notebook)			
F, 02	Review of MT1, Stability and clouds	146-166	
M, 05	Stability and clouds (continued)	ditto	7
W, 07	Precipitation, A3	170-195	
F, 09	Atmospheric pressure and winds	200-225	
M, 12	***In-class exercise***		8
W, 14	Atmospheric pressure etc. (continued)	ditto	
F, 16	**Autumn Break No class**		
M, 19	Small-scale and local winds	230-260	9
W, 21	***In-class exercise***, A4		
F, 23	Global systems	266-290	
M, 26	Global systems (continued)	ditto	10
W, 28	Air masses and fronts	296-318	
F, 30	Middle-latitude cyclones	322-342	

November

M, 02	Review for Midterm 2		11
W, 04	**Midterm 2**		
F, 06	Review MT2, Weather Forecasting	346-379	
M, 09	Whr. Fsct. (cont.) **Weather Notebook due.**	ditto	12
W, 11	**Veterans Day Holiday No class**		
F, 13	Thunderstorms, A5	384-411	
M, 16	Thunderstorms (continued)	ditto	13
W, 18	Tornadoes	416-436	
F, 20	Hurricanes	440-468	
M, 23	Hurricanes (continued)	ditto	14
W, 25	**Thanksgiving Holiday No class**		
F, 27	**Columbus Day Holiday No class**		
M, 30	***In-class exercise***		15

December

W, 02	Climate change (Past Climates)	502-532	
F, 04	Climate change (The Science)	ditto	
M, 07	Climate change (Future Projections)	ditto	16
W, 09	Review for Final		

Final Exam: Thursday December 17, 2:00 p.m.-3:45p.m.

A# means take home assignment number # handed out. It is due in class typically two weeks later; due date specified on hand out.