

AOSC 200 - WEATHER AND CLIMATE

Lectures

12.30 pm - 1.45 pm on Tuesdays and Thursdays in JMZ 0105

Discussions

0101 Wednesday 2.00 pm to 2.50 pm in CSS 2428

0102 Wednesday 3.00 pm to 3.50 pm in CSS 2428

0103 Wednesday 2.00 pm to 2.50 pm in CHE 2145

0104 Wednesday 3.00 pm to 3.50 pm in JMP 1109

Instructor

Professor Robert D. Hudson, Room 3421,

Computer and Space Sciences Building.

Phone 301-405-5394

E-mail HUDSON@ATMOS.UMD.EDU

Website <http://www.meto.umd.edu/~HUDSON/meto200.d/>

Teaching Assistants

Ashley Greene, Room 3103, Jull Hall, Phone 301-405-7722

E-mail AGREENE@ATMOS.UMD.EDU

Sandra Preaux, Room 3111, Jull Hall, Phone, 571-344-5792 (cell)

E-mail SAMPRE@ATMOS.UMD.EDU

Required Textbook:

Meteorology - Understanding the Atmosphere, Steven A. Ackerman and John A. Knox.
Published by Thomson Brooks/Cole, ISBN 0-534-37199-X

Course Description:

The influence of weather and climate affect our daily activities, our leisure hours, transportation, commerce, agriculture, and nearly every aspect of our lives. In this class we will address fundamental issues such as the greenhouse effect, severe weather, global temperature patterns and air pollution. In particular we will address how these factors could be modified as a result of climate change. Instruction in the lectures will provide the basic knowledge needed to address these issues. In the discussion sections students will be divided into groups to address the implications of the issues on their daily and future lives.

Course Goals:

- (1) For the students to take away an understanding of the fundamental basis of weather and climate change.
- (2) To give the students an appreciation of the impact of weather and climate change on their daily and future lives.

Grading

The course will be graded on the basis of two mid-term exams, one final exam, and three projects. The final grade will be assessed as follows:-

Projects	20%
Mid-term exams (2)	45%
Final Exam	35%

The first mid-term exam will be based on the lectures presented up the Thursday before the exam. The second mid-term exam will cover the period from the first mid term exam. Two thirds of the final exam will be based on the lectures given after the second mid-term exam.. The final third will be cumulative.

In the discussion sections students will be divided into groups to address the implications of weather and climate issues on their daily and future lives. For the project assignments each discussion session will be divided into groups of six students. The final output for each project will be the preparation of a power-point poster. The grade will be based on both the quality of the presentation and the participation of each student within the group.

CORE

AOSC 200 is a CORE Distributive Studies Mathematics and the Sciences, Physical Sciences *non-laboratory course*. When taken together with AOSC 201, the combination of AOSC 200 and AOSC 201 are a CORE Distributive Studies, Mathematics and the Sciences Physical Sciences *laboratory course*.

PLEASE NOTE - Students under the CORE Program requirements must take both AOSC 200 and AOSC 201 during the same semester in order to receive the CORE lab-science credit.

Weather Forecasting

A web site has been prepared which takes the student through the process of making a simple weather forecast. This site can either be accessed through Prof. Hudson's web site or at:
<http://www.atmos.umd.edu/~charles/forecastchecklist.htm>

In the last fifteen minutes of each Thursday class the instructor will work with the students to make a weather forecast for the coming weekend, using the above website.

Academic Accommodations:

If you have a documented disability, you should contact Disability Support Services 0126 Shoemaker Hall. Each semester students with documented disabilities should apply to DSS for accommodation request forms which you can provide to your professors as proof of your eligibility for accommodations. The rules for eligibility and the types of accommodations a student may request can be reviewed on the DSS web site at
http://www.counseling.umd.edu/DSS/receiving_serv.html.

Religious Observances:

The University System of Maryland policy provides that students should not be penalized because of observances of their religious beliefs, students shall be given an opportunity, whenever feasible, to make up within a reasonable time any academic assignment that is missed due to individual participation in religious observances. It is the responsibility of the student to inform the instructor of any intended absences for religious observances in advance. Notice should be provided as soon as possible but no later than the end of the schedule adjustment period. Faculty should further remind students that prior notification is especially important in connection with final exams, since failure to reschedule a final exam before the conclusion of the

final examination period may result in loss of credits during the semester. The problem is especially likely to arise when final exams are scheduled on Saturdays.

Academic Integrity:

The University of Maryland has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit <http://www.studenthonorcouncil.umd.edu/whatis.html>

The University of Maryland is one of a small number of universities with a student-administered Honors Code and an Honors Pledge, available on the web at <http://www.jpo.umd.edu/aca/honorpledge.html>. The code prohibits students from cheating on exams, plagiarizing papers, submitting the same paper for credit in two courses without authorization, buying papers, submitting fraudulent documents, and forging signatures. The University Senate encourages instructors to ask students to write the following signed statement on each examination or assignment: "I pledge on my honor that I have not given or received any unauthorized assistance on this examination (or assignment)."

Schedule

The schedule below gives the class syllabus, the dates of the exams, and the chapter of the text which contains the material to be covered in the class. You can also find this schedule on Prof. Hudson's web page. The slides used in the lectures are available in Microsoft power point format on Prof. Hudson's web page. Many students have found it useful to print out each lecture in the power point handout mode (6 slides per page) before coming to the class. It makes note taking a lot easier.

AOSC 200, SYLLABUS

DATE	CLASS		READING
		The Composition of the Atmosphere	
30-Aug	1	Introduction to the Atmosphere. How did the Earth's atmosphere evolve? Hydrologic and carbon global cycles	Chap 1
4-Sep	2	Atmospheric pressure and structure. Introduction to weather maps. Why does the Earth have seasons? What is the greenhouse effect?	Chap 1
6-Sep	3	The Energy Cycle. Force, work and heat. Transfer of energy.	Chap 2
11-Sep	4	Where is the energy from the sun absorbed on the Earth? Why does the Earth have seasons? What is the greenhouse effect? What controls the annual and daily temperature cycles ?	Chap 2
13-Sep	5	Controls of annual and daily temperature cycles at the Earth's surface.	Chap 3
18-Sep	6	Diurnal temperature cycle. Effect of volcanic eruptions. Adiabatic expansion, Wind-chill factor. Why does it rain and snow?	Chap 3
20-Sep	7	Cloud formation and development.	Chap 4
22-Sep	8	Cloud classification	Chap 4

27-Sep		Exam 1	
2-Oct	9	How are snow, sleet, freezing rain, and rain formed in the atmosphere?	Chap 4
		How do we observe the atmosphere?	
4-Oct	10	Observing the atmosphere. Ground based and satellite measurements.	Chap 5
		How are winds formed in the atmosphere?	
9-Oct	11	Newton's second law of motion.. Coriolis Force	Chap 6
11-Oct	12	Geostrophic balance. Flow around low and high pressure systems Formation of weather systems. Local winds - sea breeze.	Chap 6
		What causes the trade winds (easterlies) and Jet Streams	
16-Oct	13	Global scale winds	Chap 7
18-Oct	14	What causes Jet streams? How do they influence the transfer of heat from equator to pole?	Chap 7
23-Oct	15	Influence of ocean/atmosphere interactions on the weather and climate. El Nino and La Nina.	Chap 8
		How and where do hurricanes come from?	
25-Oct	16	How are hurricanes formed? Why do hurricanes cause such damage?	Chap 8
30-Oct		Exam 2	
		Air Masses and Fronts - heat waves and Alberta clippers.	
1-Nov	17	Heat waves and Alberta clippers.	Chap 9
6-Nov	18	Low pressure and high pressure systems. Weather patterns	Chap 10
		Severe Weather	
8-Nov	19	Thunderstorms.	Chap 11
13-Nov	20	Tornados	Chap 11
15-Nov	21	Small scale winds. Santa Ana winds. Microbursts. Chinook winds	Chap 12
		How do meteorologists forecast the weather?	
20-Nov	22	Forecasting the weather.	Chap 13
22-Nov		THANKSGIVING BREAK	
		Climate and climate change	
27-Nov	23	Present Climates. Climate zones over the Earth. What controls our current climate?	Chap 14
29-Nov	24	Past Climates. How do we detect climate change? Natural causes of climate change	Chap 14
4-Dec	25	Changing Climate. Simple Greenhouse model. Feedback mechanisms.	Chap 15
		Air Pollution	
6-Dec	26	What are the causes of air pollution and acid rain ? Linking chemistry with meteorology	Chap 15
11-Dec	27	What are the sources of pollution in Maryland? Time sequence of a pollution episode in Baltimore/Washington area	Chap 15
18-Dec		FINAL EXAM	