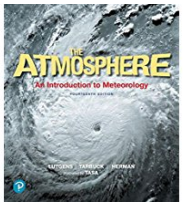
Montgomery College, Rockville
AOSC105 – Intro. To Meteorology (CRN#31634)
Syllabus – Spring 2019
Text: Lutgens and Tarbuck,
***The Atmosphere (14th ed.)*, 2019**



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Quick Start:

Course Outcomes: By the end of this semester you will be able to…

- Use clouds and optical phenomena as diagnostic tools to determine the state of the atmosphere.
- Describe daily and seasonal changes in the vertical structure of the atmosphere.
- Predict the effect of changes in atmospheric composition, seasonal changes in orientation of Earth with respect to the Sun, and changes in land cover on air temperature near the surface.
- Analyze phase changes of water in the atmosphere and the importance of these phase changes to weather.
- Compare and contrast various types of precipitation and fog in terms of their formation in the atmosphere.
- Identify factors that influence the speed and direction of wind at various levels of the atmosphere.
- Correlate surface winds with upper-level wind flow under various conditions.
- Interpret and analyze meteorological data in a laboratory setting to understand patterns in temperature, moisture, pressure, and wind.
- Distinguish between frontal and convective storms (i.e. mechanisms and effects).
- Analyze characteristics of the atmosphere that cause a current weather event.
- Trace stages in the development and evolution of severe weather events such as thunderstorms, tornadoes, and tropical storms.
- Evaluate conditions in the atmosphere to determine the potential for various forms of severe weather.
- Demonstrate in the laboratory the physical laws that govern atmospheric motions and balances.
- Compare and contrast various methods of weather forecasting and apply these methods to current weather events.
- Evaluate the effect of various factors on global climate change.

General Education Outcomes: As a result of studying current weather events, by the end of the semester you will be able to…

- Analyze critically primary data and other resources, synthesize a variety of information sources to form conclusions, and evaluate the validity of conclusions considering the limitations of gathered information (Critical Thinking).
- Determine the nature and extent of information needed, access the information efficiently, and evaluate the quality of information sources (Information Literacy).
- Locate, identify, collect, organize, analyze, and interpret data using scientific inquiry to make decisions (Scientific Reasoning).
- Utilize relevant computer applications to produce graphics and text leading to a clear presentation of results (Technological Competency).

Students may receive credit for either AOSC 100 or AOSC 105, *but not both*. Assessment levels: ENGL 101/ENGL 101A, MATH 050. May not be taken concurrently with MATH 017 or MATH 020 or MATH 045. See mathematics department on your campus for advice regarding mathematics requirements.

AOSC 105 Course Schedule (subject to change)

Date	Topic	Reading (14th ed)	Reading (13th ed)	Lab Topic
01-23	Introduction and Expectations Observing the Atmosphere: From above and below Short Paper: *How do weather and climate relate to my chosen major or other interest area?*	Wx Graphics Tutorial (on Blackboard) Ch 12 306-313, 317-320	Wx Graphics Tutorial (on Blackboard) Ch 12 324-334, 339-342	01- Intro to Weather Satellite Imaging
01-28	Energy in the Earth System: Global Energy Budget, Local Variations to Energy Budget	Ch 2 35-48	Ch 2 37-52	
01-30	Structure and Composition of the Atmosphere	Ch 1 12-20	Ch 1 14-23	02-Atm. Structure
02-04	Temperature Patterns: Seasonal Influences *Submit Background Paper*	Ch 2 28-36	Ch 2 30-38	03-IR Thermometry/ Radiation Laws
02-06	Temperature Patterns: Influence of Latitude, Altitude, and Surface Cover (e.g. Vegetation, Desert, Water, Ice)	Ch 3 55-76	Ch 3 59-84	04-Basics of Weather Analysis and Map Discussion
02-11	Local Weather Patterns	Ch 7 176-182	Ch 7 186-191; Teton Range Reading	
02-13	Exam #1			05-Phase Changes in Water Substance
02-18	Moisture Patterns: Hydrologic Cycle, Humidity, Phase Changes, Latent Heat	Ch 4 83-95	Ch 4 89-103	
02-20	"Rising Air = Active Weather": Unpacking the Equals Sign	Ch 4 96-100	Ch 4 103-108	06-Stability & Clouds
02-25	Atmospheric Stability and Cloud Development	Ch 4 100-108	Ch 4 108-116	
02-27	Dew, Frost, Fog, and Clouds	Ch 5 115-126	Ch 5 123-133; CloudTutorial	07-Isoplething
03-04	Precipitation Processes, Forms, and Measurement	Ch 5 126-142	Ch 5 134-151	
03-06	Exam #2 Midterm			TBA
03-18	Wind Patterns and Pressure Systems in 3 Dimensions	Ch 6 150-167	Ch 6 158-176	08-Jet Stream Simulation
03-20	Pressure and Wind Patterns: Jet Stream Winds and the "Five-Layer Model" (a continuation of lab 09)	Ch 7 191-194	Ch 7 200-203; Jet Streaks Rdg	09-Tale of 3 Blizzards
03-25	Air Masses and Weather Fronts	Ch 8 206-220	Ch 8 218-232,	
03-27	Extratropical Frontal Cyclones	Ch 9 226-247	Ch 9 236-261	10-Global Circula-tion Simulation
04-01	Global Climate Patterns: Wind Circulation, Climate Oscillations	Ch 7 182-191, 196-199	Ch 7 194-200, 205-208	11-Journal Review
04-03	Methods of Weather Forecasting	Ch 12 313-317, 321-329	Ch 12 334-338, 342-353	12-Weather Obs
04/08	Exam #3			Case Study Research
04-10	The Thunderstorm Cell: Basic Unit of Severe Weather	Ch 10 254-258, 264-267	Ch 10 268-272, 278-282	Case Study Research
04-15	13-NWS Storm Prediction Center comes to MC!			Case Study Research
04-17	Squall Lines, MCS, Supercells, Microbursts, and Doppler Radar	Ch 10 258-264	Ch 10 272-277	Case Study Research
04-22	Derechos and Flash Floods	Ch 10 260	Ch 10 276-277	Case Study Present
04-24	Tornadoes	Ch 10 268-278	Ch 10 282-294	Case Study Present
04-29	Tropical Storms: A Global Climate Perspective *Deadline for Written Case Study*	Ch 11 284-300	Ch 11 300-320	Case Study Present
05-01	Global Climate Change—Deep and Recent Past	Ch 14 356-376	Ch 14 382-406	Final Exam Review
05-06	Global Climate Change—Future Prospects			TBA
05-08	Final Exam (10:15 AM-12:15 PM SC406)			

Preparing Effectively for Each Class

Although AOSC105 is officially listed as a "course with lecture and lab," the "lecture" part leaves plenty of time for discussion of current weather events, short inquiry-learning activities, and forecasting opportunities. The course is highly interactive and depends upon you to take charge of your own learning. Here is how Introduction to Meteorology works (after the first session):

a. After class, access the AOSC105 Blackboard Homepage and download the PowerPoint for the next class.
b. If necessary, download any tutorial or reading from the Homepage.
c. Scan the textbook chapter that goes with the topic of the class. Give special attention to text and illustrations that go with the PowerPoint.

It is your responsibility to come to class prepared to discuss the PowerPoint illustrations and graphics and ask questions if you need clarification.

Quizzes, Exams, and Final Exam

You will have a number of **Quick Checks** during the semester. Results of Quick Checks have no point value, but they show you what you need to study and show Prof K what needs to be retaught. Checks will evaluate 1) your background understanding of concepts drawn from previewing PowerPoints or scanning assigned readings, and/or 2) your understanding of concepts already covered in class. **Your being present to do these Quick Checks will be considered as part of your class participation grade**.

You will have three **exams** during the semester. See the syllabus outline for scheduled dates. These dates are subject to change because of unscheduled college closings or other circumstances that delay the completion of topics covered on the exams. Any changes in exam dates will be announced well in advance. Each exam has a value of 100 points. If you miss an exam because of illness, **you must let Prof K know in advance by email**. You will take the make-up exam in the Assessment Center. **Make-up exams will be available for two school days (other than Saturday and Sunday) after the scheduled exam date unless arrangements for a further extension are made prior to the exam**.

The final exam, counting for 150 points, is scheduled for **Wednesday, May 8, 10:15 AM-12:15 PM, in SC406**. This test will have severe weather as its theme. **However, since concepts in this course build on one another, you will need a working understanding of most topics in AOSC105 to do well on the final exam**. Also, you may use the grade you earn on the exam, prorated to 100 points, to replace the lowest of your three test grades.

Labs and Lab Write-Ups

During lab period you will investigate topics that we discuss in lecture. For most labs, you will be asked to complete the write-up and hand it in by the end of class. In some cases you will have to complete the lab outside of class. Although working with others is allowed, **you must submit your own write-up along with original answers.** There will be 12 labs, each valued at 20 points. Your lowest two lab scores will be dropped before computing your final grade. Lab 13 has greater point value and is required for everyone.

Inquiries and Collaborative Projects

You will encounter at least five relatively short assignments that give you practice working with the more challenging concepts of the course. Each assignment has a value of 20 points. If there are more than five, only the best five grades will count.

Scientific inquiry is the backbone of AOSC105. This means that you will be encouraged to take charge of your own learning, acquiring skills and strategies to act as a practicing meteorologist at an introductory level. Near

the beginning of the semester you will explore the question, "How do weather and climate relate to my chosen major or other interest area?" In lab you will investigate the variation in structure of the atmosphere with latitude, the significance of phase changes in water in analyzing weather events, and the interaction of wind patterns at different levels, to name a few of the inquiry based topics.

The **Case Study** is a written analysis and an oral presentation analyzing the causes of a weather event that occurs sometime during this semester, **no earlier than January 22, 2019, without specific prior permission**. We will be talking about current weather events extensively in this course, and by the time you get to the second half of the semester you and your colleagues will be able to put together a Case Study yourselves. Specific criteria for the Case Study will be posted in the **Case Study-Putting the Patterns Together** folder in Blackboard and will be reviewed after the first test. **Case Studies will be presented during lab starting Monday, April 22.** The deadline for written Case Studies is **Monday, April 29**.

Attendance and Class Participation

You are expected to attend all class sessions. Understandably, there are rare occasions when you must miss a class. In this case, you are expected to notify Prof K of your absence by email prior to the class. If you miss more than three class sessions **for any reason**, you must schedule a meeting with Prof. Krayer in his office to discuss the attendance pattern and determine next steps.

Besides regular attendance, your participation is demonstrated by being part of class discussion and posting special weather observations on Blackboard in a dedicated forum. Cloud photos, reports of severe weather, snow accumulations, and other data are examples of good information to post. Also, links to popular articles on global climate change will be posted occasionally, and your feedback and comments are encouraged. Your posts will be visible to everyone in the class. Postings will be accepted through **Friday, May 3**.

The AOSC105 classroom and lab are places where learning by both students and professor happens, where the open sharing of ideas is valued and encouraged. To maintain this environment, all students are expected to abide by the Standards of College Behavior as published in the Montgomery College Student Handbook.

The use of cellular phones, smart phones, text messaging, and other electronic devices unrelated to the course should be restricted to emergencies only. Please silence your cell phone before class.

Grading Policy

Your grade will be based on the following:

Exams (3 @ 100 points)	=	300 points
Final Exam	=	150 points
Labs #1-12	=	200 points
Lab #13--SPC Comes to MC!	=	50 points
Practice Investigations	=	100 points
Introductory Paper	=	50 points
Case Study	=	100 points
Class Participation	=	50 points
Total	=	1000 points

Extra or Alternative Credit

There are a large number of weather-related videos available on YouTube. A quick search will return titles on almost any topic. You may submit a summary of a video you watch for up to 5 points extra credit. Up to four

video summaries are permitted. Please use the Video Summary Report Template, available in the **Journal Articles and Useful Links** folder on Blackboard. Fill out the template and then attach it to an email addressed to Prof K.

In addition, the **Journal Articles and Useful Links** folder contains selected research articles from the *Bulletin of the American Meteorological Society (BAMS)*. You will also find a journal review template. You may select up to two *BAMS* articles for review, each with value of up to 10 points.

Other extra credit may be offered as opportunities arise. **The deadline for all extra credit is Friday, May 3**.

Class Communication and Help

Student email along with Blackboard mail are official means of communication in AOSC105-Intro to Meteorology. Please check the college email and Blackboard regularly and frequently. **You will be held responsible for information, assignments, and announcements that I will send you**. I will check my email box every day between the hours of 8:00 AM and 6:00 PM. When you send me a message, I will reply to you, if at all possible, within 24 hours. For this class, I will use student email to communicate information about class assignments, notify you of interesting or important current weather events, and provide feedback on your work. You may use college email to notify me in advance of an absence, submit assignments as attachments, ask questions about specific content material, and initiate discussions on topics related to class work. If you submit an assignment by email, please retain a hard copy of the assignment and also a copy of the email as proof of time and date it was sent. **Assignments submitted as attachments must be submitted by 4:30 PM on the date it is due, unless another time is specified**.

Several levels of support exist to help you do your best in this course.

a. Come see me during my office hours. If you have another class during this time, you may arrange a meeting with me by appointment. Please, **please**, do not hesitate to ask for my assistance if you need it.
b. I encourage you to form study groups, especially before tests and the final exam. Group study areas exist at both ends of the 4th floor of the Science Center.

Special Needs

Any student who may need an accommodation due to a disability, please make an appointment to see me during my office hour. A letter from Disability Support Services (R-CB122; G-SA175; or TP-ST120) authorizing your accommodations will be needed. Any student who may need assistance in the event of an emergency evacuation must identify to the Disability Support Services Office; guidelines for emergency evacuations for individuals with disabilities are found at: www.montgomerycollege.edu/dss/evacprocedures.htm

If you are a veteran or on active or reserve status and you are interested in information regarding opportunities, programs, and/or services, please visit the Combat2College website at: www.montgomerycollege.edu/combat2college.

"I wish you all the best for a most successful semester." – Prof. Krayer