

Syllabus

EART 12 – Introduction to Weather and Climate, Spring 2011

Instructor: Mark Snyder

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Office Hours: Tuesdays 2:30 to 3:30 PM and 4:30 to 5:30 PM, or by appointment

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Office Hours: Tuesdays 1 – 2 PM and Wednesdays 12 – 1 PM.

Course Information

Class Website: <http://es.ucsc.edu/~msnyder/eart12.html>

Class Meeting Times: Tues and Thurs 6:00 pm – 7:45 pm in Thimann Lecture 1

Discussion Sections: All sections meet in Earth and Marine Sciences, D226

Section Policy: Attendance in your assigned section each week is required. If you miss more than two sections without good reason, you will lose 1% off your final grade for each missed section. Attendance will be taken at each section. If you are for some reason unable to attend your assigned section, please contact the TA or instructor as soon as possible to make other arrangements.

Supplemental Material: Will be provided through the course website. I will provide the supplementary material as required. Unless otherwise noted, all handouts are to be considered part of the core material.

Missed Classes: If you miss class, you should get notes from a fellow student.

Textbook: “The Atmosphere: An Introduction to Meteorology” by Lutgens and Tarbuck available from the Bookstore. The 11th edition is the latest, but other recent editions should be perfectly fine also. You should feel free to grab any edition between the 8th and 11th.

Course Outline

In this course, we will learn about the atmospheric phenomena that are important to our everyday lives – clouds, precipitation, storms, hurricanes, lightning, tornadoes, ozone hole, greenhouse effect, air pollution – now and in the future. To do so, we will first examine some of the more fundamental concepts that are common among many of these phenomena, such as atmospheric moisture, temperature, winds, and sunlight, after which we will examine elements of weather and climate. Topics to be covered include:

- Basics of the atmosphere and the sun
- Water, clouds, and precipitation
- Winds, atmospheric circulation and weather patterns
- Air masses, fronts, and cyclones
- Severe weather: lightning and thunder, tornadoes, hurricanes,
- Atmospheric composition and chemistry
- Greenhouse effect; stratospheric ozone depletion
- Aerosol effects on climate
- Urban air pollution

Evaluation

Homework: 40%; Midterm: 20%; Final exam: 40%

Homework sets: These will be comprised mainly of quantitative problems. There will be approximately 8 problem sets during the quarter. Homework sets will be due at the beginning of lecture on Tuesday in the box at the front. Unless previous arrangements are made, homework sets turned in late (after the first five minutes of class) are worth 50%; homework sets more than 24 hours late will not be accepted.

Exams: Exams will be made up of short answer questions (approx. 2/3 of points) and quantitative questions (approx. 1/3 of points). A list of potential short answer questions will be provided ahead of time.

Extra credit: ** There will be no extra credit offered to any individuals. No exceptions. ** I may give out extra credit work, but if I do, it will be available to all students in the class.

Grades

Grading will not necessarily be “on a curve.” There is no expectation of what the average grade should be, nor of what the grade distribution should look like. If everyone were to demonstrate outstanding understanding of all the material, then everyone deserves a grade of A (and I would be very happy to give each one of them)! I therefore encourage you to discuss the course material with each other to get the most out of the class.

I will **guarantee** the following letter grades: if you get a 90% or above, you will get an A or better; 80% = B or better; 70% = C or better. The scale could slide downwards, e.g.. an A is actually 86% or better, but what I am saying is that it won’t slide upwards.

EART 12 Preliminary Schedule

Week 1

Topics
Mar 29 SI units, geometry, scientific notation, composition of Earth's atm, periodic table, gases, aerosols, vertical structure of atm, thickness of atm, properties of gases (temperature and pressure).
Mar 31 Continue properties of gases (pressure), ideal gas law
Readings: Chapters 1, 2, and 3

Week 2

Topics
Apr 5 Density and buoyancy, energy in the atmosphere.
Apr 7 Energy continued
Readings: Chapter 4

Week 3

Topics
Apr 12 Greenhouse layer, seasons, humidity
Apr 14 Cloud formation, lapse rates
Readings: Chapter 5

Week 4

Topics
Apr 19 ELR (environmental lapse rate), inversions, fogs, warm clouds
Apr 21 Warm clouds summary, cold clouds, winds, pressure gradient force, coriolis
Readings: Chapters 6 and 7

Week 5

Topics
Apr 26 Geostrophic wind, curved flow and the gradient wind, friction and surface winds
Apr 28 **Midterm Exam Review**
Readings: None

Week 6

Topics
May 3 ****Midterm Exam****
May 5 Cyclones and anticyclones, monsoons, global and regional atmospheric circulation, pressure systems, westerlies and the jet stream, ENSO and La Nina
Readings: Chapter 8

Week 7

Topics
May 10 Return midterm, midterm analysis
May 12 Air masses and fronts (Chapter 8), air mass formation
Readings: Chapter 9

Week 8

Topics
May 17 Thunderstorms and Tornadoes
May 19 Hurricanes
Readings: Chapters 10 and 11

Week 9

May 24
May 26
Readings:

Topics

Air Pollution
Anthropogenic Global Warming
Chapters 13 and 14

Week 10

May 31
Jun 2
Readings:

Topics

Anthropogenic Global Warming
Final Exam Review
Chapter 14 continued

Final Exam:

Wednesday June 8th – 8:00 AM to 11:00 AM