

METEO 440W - ATMOSPHERIC MEASUREMENT PRINCIPLES

JAN 2008

Meeting Mondays at 125 pm in Walker 126 for Lecture.

Lab Sections also meet in Walker 126.

Lab Section 1 - Tuesdays 2:30-5:30 pm; Lab Section 2 - Thursdays 2:30-5:30 pm.

Instructor: Dr. Anne M. Thompson, amt16@psu.edu

Phone: 814-865-0479 Room: 510 Walker Bldg

Office Hours: Wed., Thurs, 11-noon. or after class Monday - 1415-1515

Teaching Assistant: Ethan Davis, ead192@psu.edu

Phone: None Room: 530 Walker Bldg

Office Hours: TBD

COURSE OBJECTIVES: These are threefold and related to one another.

- (1) Learn principles and techniques for making common physical and chemical measurements related to the atmosphere. Some of these will illustrate theory and concepts taught in Meteo 431, 436 and 437.
- (2) Learn about observations and data, including precision, accuracy and simple statistical analysis. Learn to analyze sets of measurements to discover properties and behavior of the atmosphere.
- (3) Learn how to report and write up scientific results in standard form, with Abstract, Introduction, Experimental/Method/Procedure, Results, Discussion, Conclusion, referencing where appropriate.

CLASS FORMAT AND CONTENT:

A combination of one 50-min lecture and one 3-hr laboratory session each week. Lectures will describe general measurement approaches, additional background for specific experiments and data sets, error analysis. There will also be lectures and class discussion on elements of writing. Discussion will include analysis of published work and class work in progress.

There are 8 laboratory Experiments for which written reports with "Results" and "Discussion" sections are due. Other sections will be assigned as Homework. A data analysis project in the last weeks of class will hone your new analytical and writing skills in a Final Report. The Final Report will be graded on technical and analytical skills demonstrated in the text as well as on originality and writing elements.

Experiments are posted on **ANGEL**. Expect to work hard, have fun and leave the course with mastery of rudimentary laboratory skills and more confidence in your written scientific work.

COURSE CREDIT:

Grade is based on four elements, as below. The Final Report replaces a Final Exam. Active participation in class and laboratory are important in 440W and are a significant part of the grade.

- (1) Laboratory Reports, 40%
- (2) Writing HW & Exam, 25-30%
- (3) Final Report, 20-30%
- (4) Class Participation, 10-15% Total = 100%

EXPECTATIONS OF CLASS:

- (1) Punctuality in class and lab. The lecture is short and labs can be long.
- (2) No missed classes or labs because it is unfair to your lab partner, limited equipment is available and to the Teaching Assistant (TA), who has heavy instructional responsibility.
- (3) Assignments handed in on time. Lateness is unfair to other students and you will lose points. The grading burden on the Instructor and TA in this course is too heavy for exceptions.
- (4) Class participation, initiative and creativity are valued in the lab and in written assignments.
- (5) LAB CLASSES!!! "SAFETY FIRST" IS A GOOD MOTTO. You will be handling delicate and expensive equipment in some cases. Be careful.

ACADEMIC INTEGRITY AND STANDARDS:

I remind you of the College Policy on Academic Integrity that can be viewed at <http://www.ems.psu.edu/students/integrity/form.pdf>. Written assignments are to be YOUR OWN work only. In addition, there are special rules for data handling. You will work in pairs to generate the data. You and your partner will only use your own data in the reports.

OTHER NOTES:

Let Instructor or TA know in advance of religious observances, any required disability accommodation.

Text & Reference:

Manual and Assignments (and lecture notes) will be on Angel.

Purchase Schall if you do not have it. I took the following from the Web. Note ISBN.

EMS students can pick up a free copy of *Style for Students* in the EMS Writing Center, and other Penn State students can purchase it at the Penn State bookstore. To order the book directly from the publisher, call Cengage Learning at 800-355-9983. The cost of the book from the publisher is \$14 plus shipping, and the ISBN is 1-58175-272-5.

These books might be useful for the lab material.

J. Wallace & P. V. Hobbs, *Atmospheric Science*, Introduction to Meteorology

J. H. Seinfeld & S. N. Pandis, *Atmospheric Chemistry and Physics: From Air Pollution to Climate Change*, Wiley-Interscience, 1998.

P. V. Hobbs, *Introduction to Atmospheric Chemistry*, Cambridge University Press, 2000.

G. W. Petty, *A First Course in Atmospheric Radiation*, 1st or 2nd edition, Sundog Press, 2004, 2006.

P. V. Hobbs, *Basic Physical Chemistry for the Atmospheric Sciences*, Cambridge University Press, 1995; 2nd ed., 2000.

**METEO 440W - ATMOSPHERIC MEASUREMENT PRINCIPLES
SPRING 2008**

Dr. A. Thompson, Instructor
Ethan Davis, Teaching Assistant

Week	Lecture/ Class	Topic	Reading	Lab Assigned/ Due
1	Mon, 14 Jan	Introduction & Overview, Course Survey Word Processing, etc		Lab does not meet
2	Mon, 21 Jan NO LECTURE	NOTE:: Prior to Lab Precision/ Accuracy Measurement, Controls, Calibration, Standards		Thermocouple Calibration
3	Mon, 28 Jan	Intro to Latent Heat, Dew Pt Labs		Latent Heat Lab <u>Assignment: Read Paper #1</u>
4	Mon, 4 Feb	Scientific Paper Elements Discussion of Paper 1	Paper #1	Hygrometry/ DP Lab Latent Heat <u>Report DUE</u>
5	Mon, 11 Feb	Writing Elements - Discuss Latent Heat Report		Cloud Chamber Lab Dew Point <u>Report DUE</u>
6	Mon, 18 Feb	Writing Elements		Cloud Chamber <u>Report DUE</u> Lab = Writing Exercises
7	Mon, 25 Feb	Het Freezing, Radiation Lab Principles		Het Freezing Lab Writing Assignment <u>DUE</u>

CHANGES AS OF 3 MARCH !!

8 Mon, 3 Mar

**SONDE INTRO FOR WRITING
"TAKE-HOME TEST" - DUE 24 MARCH**

Radiation Lab - Beers Law
Het Freez. Report DUE

BREAK – Week of 10 March

Week	Lecture/ Class	Topic	Reading	Lab Assigned/ Due
9	Mon, 17 March	Precipitation Measurements, Acid Rain Principles		WRITING LAB - DISCUSS PAPER #2 Rad Lab I <u>Report DUE</u>
		BEGIN Rain Gauge Design		
10	Mon, 24 March	NO LECTURE - TURN IN TAKE-HOME TO TA		<u>Review Rain Gauges</u>
<u>COLLECT PRECIP. - 27 Mar-11 Apr. NOTE!!!! SAVE PRECIP FOR ACID RAIN LAB</u>				
11	Mon, 31 March	REVIEW TAKE-HOME, METHODS & RESULTS WRITING		Rad Lab II
12	Mon, 7 April	Air Quality Lecture/ Project Intro		Acid Precip. Lab Rad Lab II <u>REPORT DUE</u>
13	Mon, 14 April	NO Lecture		<u>RAIN GAUGE REPORT DUE</u> Lab Project I
14	Tues, 21 April	NO Lecture		Acid Precip. <u>Report DUE</u> Lab Project II
15	Mon, 28 April	Review Class. Project Q/ A. SRTE		Any Lab finish & <u>Report</u>
<u>Final Report Due - 2 May. This is a change! No exceptions</u>				