

METR 3613: Meteorological Measurements



Fall 2010: Syllabus*

Time and Location:

Lectures: M, W 1:00 - 1:50 PM, NWC 1350
Help Sessions F 1:00 - 1:50 PM, NWC 1350 or NWC 5302

Labs: Section 011: T 9:30 - 11:30 AM, NWC 5302
Section 012: W 2:00 - 4:00 PM, NWC 5302

Instructors:

Dr. Petra Klein (pkklein@ou.edu)
NWC 5339, Phone 325-1631
Office hours: M/F 2:15 – 3:00pm or by appointment

Teaching Assistants:

Jose Galvez (jmgalvez@ou.edu)
NWC 5335
Office hours: T/R 11:00am-12:00pm or by appointment

Required Textbook:

METEOROLOGICAL MEASUREMENT SYSTEMS,
by Fred V. Brock and Scott J. Richardson, Oxford
University Press, 2001

Additional material:

Most of the course material, such as lecture notes, lab instructions and project descriptions, will be posted on Desire2Learn. **Make yourself familiar with Desire2Learn and check it frequently for new material and announcements.** It is required that you download the lab instructions and read them before you come to the labs. **You are also required to purchase lab books for taking notes during laboratory classes and to document your project studies.**

Grading and Exams:

Labs (5), in total:	25%
Long-term Project	25%
Two In-Class Exams (September, November, each 25%):	50%
Final Comprehensive Exam (December):	25%

The lowest score of the 3 exams can be dropped. The lab grades and project grade cannot be dropped

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Purpose of this Course

No matter what area of meteorology is of special interest to you, measurements of the atmospheric parameters will undoubtedly influence your work. In any area of science, it is our observations of nature that lead to new theories and new understanding. In meteorology, we cannot hope to make a successful weather prediction unless we have sufficient knowledge of the current state of the atmosphere. The maps we use give us a representation of this state. The models we use ingest this initial state and churn out a predicted state for the future. Thus, knowledge of the techniques used to obtain these measurements, the possible flaws in the data collected, and the manipulations performed on the data before they are used are essential to any meteorologist, whether a forecaster or a researcher. This course is designed to provide you with this knowledge.



Objective

This course is designed for meteorology majors. The main objective is to provide you with an understanding of the concepts used in performing careful meteorological measurements and of the equipment used for these measurements. We will discuss the limitations of the instruments and identify major causes of errors in measurement output. Furthermore, we will teach to you basic procedures of data analysis and interpretation, and you will learn to work effectively in a team.

Methods

To facilitate the learning process, this course will use a variety of settings. We will have a mix of **standard classroom lectures, hands-on labs, and a long-term, hands-on project**. Additionally help sessions on different topics will be offered on select Fridays (see attached schedule). Participation in these Help Sessions is strongly recommended. It is a good practice to bring hard copies of the b/w lecture notes that are posted on D2L to class. This will allow you to easily take notes during the lectures. **It is expected that you review the material covered in class and read the relevant chapters of the textbook even when no formal reading assignments are given in class (unannounced quizzes covering the material from the previous lectures can be expected).**



In order to perform the laboratory experiments successfully and in a timely manner, **it is absolutely necessary that you read the lab description before coming to the lab classes. You need to download the description from Desire2Learn and bring a printed copy to the lab classes. At the beginning of each lab, a quiz will be given to check how well you are prepared to perform the lab exercises. Each quiz will be graded as 10% of the grade corresponding to each lab exercise. If you fail to**

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demonstrate that you are prepared, the lab instructor has the right to exclude you from the labs. Formal lab reports must be submitted 2 weeks after completion of the experiments (see attached schedule for deadlines). An outline and instructions for the lab reports will be handed out and discussed at the beginning of the course and it is very important that you closely follow the instructions.

The long-term projects will provide you additional hands-on experience in working with meteorological instruments, and you will also learn to record and analyze meteorological data. In the design of the projects, we also put emphasis on demonstrating you the sensitivity of meteorological data towards instrument and exposure errors. For a successful completion of the projects we expect you to participate in studies at sites near/on the NWC. The number and dates for the project studies depends on the particular project. Please carefully check the attached schedule and project descriptions for the specific dates of each project. In the case of bad weather, we reserve the right to re-schedule the project studies on a short notice. We will present further details on the different types of projects during the second week of class. Please choose then your project according to your main interest and the schedule that fits best your plans during the Fall of 2010.

Lab and projects reports: All semester long, you will work on your lab and project assignments in a team of 3-5 students (same team for both the labs and projects). The teams will be formed at the beginning of the semester and we expect them to remain unchanged until the end of the semester. It is in your own best interest that you cooperate well with your team members and effectively work together during the lab experiments. We also strongly encourage team work during the project studies, and in the analysis and discussion of your results. **However, we expect that each student prepares an independent write-up and submits its own laboratory and project report.** Any form of copying text from reports of other students, the laboratory and project descriptions posted on the web, or any other material publicly available without making references will be treated as plagiarism, and actions will be taken according to the academic misconduct code further described below. See also <http://www.ou.edu/provost/integrity/#3> for examples of plagiarism.

Web Sites

You can find the main web site for this class on the Desire2Learn (D2L) system: <https://learn.ou.edu/index.asp>. All necessary course materials (lab descriptions, assignments, grades, etc.) and important announcements (e.g., directions to the field-trip sites) will be posted on this site. Please become familiar with this site and check it frequently. You have to submit all your lab and project reports to drop boxes on D2L.

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Attendance and Make-up Policy

In this class, participation will be strongly encouraged. Note that some material will be available only during class, and unannounced quizzes will be given. For both of these reasons, we expect 100% attendance to be the norm. **Laboratory exercises and project related studies absolutely require your attendance and cannot be made up without PRIOR permission which will be granted on a case-by-case basis, and under extraordinary circumstances.**

IF YOU MISS A LAB, YOU MAY NOT USE SOMEONE ELSE'S DATA!! Any attempt to do so without permission by the instructors will be treated as academic misconduct, and actions will be taken according to the academic misconduct code described further below.

Only under extraordinary circumstances make-ups will be given if an exam is missed. **You MUST notify the instructor BEFORE the exams. Sickness will be accepted as an excuse only if accompanied by a note from a physician.**

Other Important Policies

Reasonable Accommodation: The University of Oklahoma is committed to providing reasonable accommodation for all students with disabilities. Students with disabilities who require accommodations in this course are requested to speak with the professor as early in the semester as possible. **Students with disabilities must be registered with the Disability Resource Center prior to receiving accommodations in this course.** The Disability Resource Center is located in Goddard Health Center, Suite 166, phone 405/325-3852 or TDD only 405/325-4173.

Academic Misconduct: All provisions of the Norman Campus Academic Misconduct Code shall apply in cases of academic dishonesty. Academic misconduct is defined as “any act that improperly affects the evaluation of a student’s academic performance or achievement.” All faculty at the University of Oklahoma expect academic integrity from each student. Misconduct such as plagiarism, fabrication, and fraud, as well as attempting to commit such acts or assisting others in so doing, will not be tolerated. Students are responsible for knowing the academic misconduct code, which is included in the student code (http://judicial.ou.edu/images/stories/student_codebook.pdf). All instances of alleged academic misconduct will be thoroughly investigated and action will be taken according to the rights and responsibilities under the academic misconduct code described at <http://www.ou.edu/provost/integrity-rights/>.

Important Dates

1st Hourly In-Class Exam:	Monday, September 27, 2010
2nd Hourly In-Class Exam:	Friday, November 19, 2010
Final Exam:	Friday, December 17, 2010

For more information on other deadlines see also the attached detailed schedule.

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Tentative Schedule and list of course topics:

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Date	Event	Lecturer	Topic	Comments/Deadlines
Wednesday, August 04, 2010				
Thursday, August 05, 2010				
Friday, August 06, 2010				
Saturday, August 07, 2010				
Sunday, August 08, 2010				
Monday, August 09, 2010				
Tuesday, August 10, 2010				
Wednesday, August 11, 2010				
Thursday, August 12, 2010				
Friday, August 13, 2010				
Saturday, August 14, 2010				
Sunday, August 15, 2010				
Monday, August 16, 2010				
Tuesday, August 17, 2010				
Wednesday, August 18, 2010				
Thursday, August 19, 2010				
Friday, August 20, 2010				
Saturday, August 21, 2010				
Sunday, August 22, 2010				
Monday, August 23, 2010	Lecture 1	Petra Klein	Introduction - Course Overview	
Tuesday, August 24, 2010				
Wednesday, August 25, 2010	Lecture 2	Petra Klein	Basic Electronics	
	No lab session			
Thursday, August 26, 2010				
Friday, August 27, 2010	Lecture 3	Petra Klein	General overview of measurement systems	Hand Out Papers to Read
Saturday, August 28, 2010				
Sunday, August 29, 2010				
Monday, August 30, 2010	Lecture 4	Petra Klein	Definitons	
Tuesday, August 31, 2010	Lab Intro	Jose Galvez	Organizational remarks, team selection, etc.	

Date	Event	Lecturer	Topic	Comments/Deadlines
Wednesday, September 01, 2010	Lecture 5	Petra Klein	Errors, standards and Static Performance Characteristics	
	Lab Intro	Jose Galvez	Organizational remarks, team selection etc.	
Thursday, September 02, 2010				
Friday, September 03, 2010	Help Session 1	Petra Klein	Overview of the projects and information about writing of lab reports	Deadline: Bring a written summary of the assigned paper to class
Saturday, September 04, 2010				Football: Utah State @Sooners, 6pm
Sunday, September 05, 2010				
Monday, September 06, 2010	Laborday			
Tuesday, September 07, 2010	Lab 1-Group A	Jose Galvez	Basic electronics	
Wednesday, September 08, 2010	Lecture 6	Petra Klein	Static Performance Characteristics	
	Lab 1-Group B	Jose Galvez	Basic electronics	
Thursday, September 09, 2010				
Friday, September 10, 2010	Help Session 2	Petra Klein	Info session about METR Exchange programs	
Saturday, September 11, 2010				Football: Seminoles @Sooners, 2.30pm
Sunday, September 12, 2010				
Monday, September 13, 2010	Lecture 7	Petra Klein	Static Performance Characteristics	
Tuesday, September 14, 2010				
Wednesday, September 15, 2010	Lecture 8	Petra Klein	Thermometry	
	Lab 1-Group C	Jose Galvez	Basic electronics	
Thursday, September 16, 2010				
Friday, September 17, 2010	Projects	Petra Klein + Jose Galvez	Tour of the NWC Roof Observatory, Instrument Set-up	
Saturday, September 18, 2010				Football: Falcons @Sooners, 2.30pm
Sunday, September 19, 2010				
Monday, September 20, 2010	Lecture 9	Petra Klein	Thermometry	Deadline Lab Report 1 - Group A, 8pm
Tuesday, September 21, 2010	Lab 2-Group A	Jose Galvez	Wind vane calibration	Deadline Lab Report 1 - Group B, 8pm
Wednesday, September 22, 2010	Lecture 10	Petra Klein	Review session	
	Lab 2-Group B	Jose Galvez	Wind vane calibration	
Thursday, September 23, 2010				
Friday, September 24, 2010	Projects	Petra Klein + TA	Sounding Releases plus Roof Studies	
Saturday, September 25, 2010				Football: Sooners@ Bearcats, TBA
Sunday, September 26, 2010				
Monday, September 27, 2010	Exam 1	Petra Klein		
Tuesday, September 28, 2010				Deadline Lab Report 1 - Group C, 8pm
Wednesday, September 29, 2010	Lecture 11	Petra Klein	Barometry	
	Lab 2-Group C	Jose Galvez	Wind vane calibration	
Thursday, September 30, 2010				

Date	Event	Lecturer	Topic	Comments/Deadlines
Friday, October 01, 2010	Texas Game Day			
Saturday, October 02, 2010				Football: Longhorns @Sooners, TBA
Sunday, October 03, 2010				
Monday, October 04, 2010	Lecture 12	Petra Klein	Dynamic Performance Characteristics	Deadline Lab Report 2 - Group A, 8pm
Tuesday, October 05, 2010	Lab 3-Group A	Jose Galvez	Thermistor calibration	Deadline Lab Report 2 - Group B, 8pm
Wednesday, October 06, 2010	Lecture 13		Dynamic Performance Characteristics	
	Lab 3-Group B	Jose Galvez	Thermistor calibration	
Thursday, October 07, 2010				SoM Career Fair, NWC
Friday, October 08, 2010	No Help Session: SoM anniversary seminars			SoM Anniversary
Saturday, October 09, 2010				SoM Anniversary
Sunday, October 10, 2010				
Monday, October 11, 2010	Lecture 14		Dynamic Performance Characteristics	
Tuesday, October 12, 2010				Deadline Lab Report 2 - Group C, 8pm
Wednesday, October 13, 2010	Lecture 15	Petra Klein	Dynamic Performance Characteristics	
	Lab 3-Group C	Jose Galvez	Thermistor calibration	
Thursday, October 14, 2010				
Friday, October 15, 2010	Back-up Date for Project Studies or Help Session on Writing	Petra Klein		Deadline for draft of your project midterm report (literature review part) all 3 groups
Saturday, October 16, 2010				Football: Cyclones @Sooners, TBA
Sunday, October 17, 2010				
Monday, October 18, 2010	Lecture 16	Petra Klein	Hygrometry	Deadline Lab Report 3 - Group A, 8pm
Tuesday, October 19, 2010	Lab 4-Group A	Jose Galvez	Time constant	Deadline Lab Report 3 - Group B, 8pm
Wednesday, October 20, 2010	Lecture 17	Petra Klein	Hygrometry	
	Lab 4-Group B	Jose Galvez	Time constant	
Thursday, October 21, 2010				
Friday, October 22, 2010	Help Session:		Feedback on Midterm Reports	
Saturday, October 23, 2010				Football: Sooners @ Tigers, TBA
Sunday, October 24, 2010				
Monday, October 25, 2010	Lecture 18	Petra Klein	Anemometry	
Tuesday, October 26, 2010				Deadline Lab Report 3 - Group C, 8pm
Wednesday, October 27, 2010	Lecture 19	Petra Klein	Anemometry	
	Lab 4-Group C	Jose Galvez	Time constant	
Thursday, October 28, 2010				
Friday, October 29, 2010	Fieldtrip	OCS	Tour of the Mesonet Facilities	
Saturday, October 30, 2010				Football: Buffaloes @ Sooners, TBA
Sunday, October 31, 2010				

Date	Event	Lecturer	Topic	Comments/Deadlines
Monday, November 01, 2010	Lecture 20	P. Klein	Precipitation measurements	Deadline Lab Report 4 - Group A, 8pm
Tuesday, November 02, 2010	Lab 5-Group A	Jose Galvez	Rain Gauges	Deadline Lab Report 4 - Group B, 8pm
Wednesday, November 03, 2010	Lecture 21	P. Klein	Radiation	
	Lab 5-Group B	Jose Galvez	Rain Gauges	
Thursday, November 04, 2010				
Friday, November 05, 2010	Help Session 5	Petra Klein	More Information about project report requirements	
Saturday, November 06, 2010				Football: Sooners @ Aggies, TBA
Sunday, November 07, 2010				
Monday, November 08, 2010	Lecture 22	P. Klein	Radiation	
Tuesday, November 09, 2010				Deadline Lab Report 4 - Group C, 8pm
Wednesday, November 10, 2010	Lecture 23	Jose Galvez	Upper-Air Measurements	
	Lab 5-Group C	Jose Galvez	Rain Gauges	
Thursday, November 11, 2010				
Friday, November 12, 2010	Help Session 6	Petra Klein	What to do with all the data/results from my project studies	
Saturday, November 13, 2010				Football: Red Raiders @ Sooners , TBA
Sunday, November 14, 2010				
Monday, November 15, 2010	Lecture 24		Sodar and Scintillometer Measurements	Deadline Lab Report 5 - Group A, 8pm
Tuesday, November 16, 2010	Lab 6-Group A	Petra Klein + Jose Galvez	Informal discussion of project results and progress with report	Deadline Lab Report 5 - Group B, 8pm
Wednesday, November 17, 2010	Lecture 25	Petra Klein	Review	
	Lab 6-Group B+C	Petra Klein + Jose Galvez	Informal discussion of project results and progress with report	
Thursday, November 18, 2010				
Friday, November 19, 2010	Exam 2			
Saturday, November 20, 2010				Football: Sooners @ Bears, TBA
Sunday, November 21, 2010				
Monday, November 22, 2010	Help Session 7	Petra Klein	How to make a presentation - Examples from last years student presentations	
Tuesday, November 23, 2010				Deadline Lab Report 5 - Group C, 8pm
Wednesday, November 24, 2010	Thanksgiving			
Thursday, November 25, 2010	Thanksgiving			
Friday, November 26, 2010	Thanksgiving			
Saturday, November 27, 2010	Thanksgiving			Football: Sooners @ Cowboys, TBA
Sunday, November 28, 2010	Thanksgiving			
Monday, November 29, 2010	Lecture 26	TBA	Radar, Guest Lectures	
Tuesday, November 30, 2010	LTP presentations-Group A	Student Teams supervised by P.Klein and J.Galvez	Presentation of long-term projects	

Date	Event	Lecturer	Topic	Comments/Deadlines
Wednesday, December 01, 2010	Lecture 27	TBA	Radar, Guest Lectures	
	LTP presentations- Group B	Student Teams supervised by TA + P. Klein	Presentation of long-term projects	
Thursday, December 02, 2010				Deadline for long-term project reports - Groups A+B, 8pm
Friday, December 03, 2010				
Saturday, December 04, 2010				BIG 12 Championship in Arlington
Sunday, December 05, 2010				
Monday, December 06, 2010	Lecture 28	P. Klein	Visibility and Cloud Height,	
Tuesday, December 07, 2010				
Wednesday, December 08, 2010	Lecture 29	P. Klein	Last lecture - review session	
	LTP presentations- Group C	Student Teams supervised by P.Klein and J.Galvez	Presentation of long-term projects	
Thursday, December 09, 2010				Deadline for long-term project reports - Groups C, 8pm
Friday, December 10, 2010				
Saturday, December 11, 2010				
Sunday, December 12, 2010				
Monday, December 13, 2010				
Tuesday, December 14, 2010				
Wednesday, December 15, 2010				
Thursday, December 16, 2010				
Friday, December 17, 2010	Final Exam		8.00-10.00am	
Saturday, December 18, 2010				
Sunday, December 19, 2010				
Monday, December 20, 2010				
Tuesday, December 21, 2010				
Wednesday, December 22, 2010				
Thursday, December 23, 2010				
Friday, December 24, 2010				
Saturday, December 25, 2010				
Sunday, December 26, 2010				
Monday, December 27, 2010				
Tuesday, December 28, 2010				
Wednesday, December 29, 2010				
Thursday, December 30, 2010				
Friday, December 31, 2010				