**Environmental Instrumentation**

**ATMOS 5050/6050/ME EN 6960**

**Spring 2014**

**ATMOS 5050 2 units**

**ATMOS 6050/ME EN 6960 3 Units**

**Rm 703 WBB. TH 12:25 PM-01:45 PM**

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**Overview.** This is the second offering for the instrumentation course in the half semester form for undergraduates and semester-length course for graduates. However, the format for the course will be more completely “flipped” with many lectures provided online and most class time devoted to hands on laboratory and field experiences. The course is designed so that all students will become familiar with electronic instrumentation used to measure conditions at the earth’s surface and in the atmospheric boundary layer. The course will emphasize applying that understanding in the laboratory and at a field site near campus. The required text is *MEASUREMENT METHODS IN ATMOSPHERIC SCIENCES by Stefan Emeis*.

**Expected Course Outcomes**. After completion of the course, you will have gained the knowledge and experience to be able to do the following:

* State the underlying principles associated with instrumentation and data acquisition units
* Develop proficiency integrating instrumentation to data acquisition units and programming those units
* Develop proficiency to use environmental instrumentation in the laboratory and outdoors including following defined safety practices and using electronic equipment individually and as part of teams
* Recognize the steps involved in organizing and conducting scientific research using field equipment

**Course Content**

**Jan 7**: Course Introduction

**Jan 9:** Time response discussion. Lab 1- Time response. **Due: Lecture 1 quiz.**

**Jan 14:** Performance characteristics discussion. Lab 1- Time response cont. **Due: Lecture 2 quiz.**

**Jan. 16:** Precipitation discussion. Lab 2- Programming dataloggers. **Due: Lecture 3 quiz and Lab 1.**

**Jan 21:** Meteorological sensors discussion. Lab 3- measuring snow depth. **Due: Lecture 4 quiz.**

**Jan 23:** Safety discussion.Lab 3- measuring snow depth cont. **Due: Safety quiz and Lab 2.**

**Jan 28:** Siting discussion**.** Lab 4- Setting up a weather station at Mtn Met lab. **Due: Lecture 5 quiz**

**Jan 30:** Electronics discussion. Lab 4- Setting up a weather station at Mtn Met lab cont. **Due: Lab 3.**

**Feb 4:** Lab 4: Take down weather station. **Due** **Lecture 6 quiz.**

**Feb 6:** Lab 4: data analysis. **Due: Lab 4.**

**Feb 11:** Upper air discussion Lab 5- Rawinsonde prep.  **Due: Lecture 7 quiz**.

**Feb 13:** Lab 5- Rawinsonde launch

**Feb 18:** Remote sensors discussion Lab 6. Sodar. **Due: Lecture 8 quiz.**

**Feb 20:** Lab 6. Sodar data analysis. **Due: Lab 5.**

**Feb 25:** Campbell site visit. Leave campus 12:30 return by 5:30. Online 5050 Final released. 6050/6960 Midterm. **Due: Lab 6.**

Feb 27. Grad students: Discuss projects/second half logistics

Mar 4, 6. Pardyjak. Reading discussion

Mar 11, 13. Spring break

Mar 18, 20. Pardyjak

Mar 25, 27. Radiation (Hoch?)

Apr 1, 3. Microelectronics (Whiteman?)

Apr. 8, 10. Bowling?

Apr 15, 17. Air chemistry (Perry?)

Apr 22. Wrap up.

Apr 25. Open house/posters at Mtn Met lab

Course Format and Requirements

Much of the lecture material during the first half semester will be presented online. You are expected to review that content and complete the corresponding online assignment prior to the associated lab assignments. Time will be given in class to discuss the lecture material and any issues raised by the online assignment. You must complete with a minimum of 80% the online assignments in Canvas in order to begin the lab. The lab assignments will normally be completed and turned in within a week. Lab assignments may require you to travel to the Mountain Meteorology Field site on the southeast corner of campus (reachable by bus).

All students will work in teams to complete lab assignments. Plan now on the Campbell Scientific field trip on the afternoon of 25 February.

 Graduate students will work in small teams during the semester to complete a class project.

As a lab course, you should expect the course to require in excess of 6 hours (9 hours) on average per week for ATMOS 5050 (ATMOS 6050/ME EN 6960) even though the nominal class hours are considerably less. TAs will be available after the regularly scheduled end of the class on Tuesday and Thursday to assist you. However, you may need to make arrangements to have access to the lab at other times to complete assignments.

Class Policies and Grading

Security of the instrumentation and lab computers is critical. You are responsible to maintain that security. You will be required to check out equipment for use in the lab and in the field and that equipment remains your responsibility until it is checked back in. Lab and field safety is also critical- follow procedures specified in the safety lecture and assignment. Severe violations of security and safety procedures will lead to removal from the course and a failing grade.

For ATMOS 5050: grades be determined from: (1) class/lab attendance, participation, and following safety and security procedures (5%) (2) online assignments (35%); (3) lab assignments (35%); final exam (25%).

For ATMOS 6050/ME EN 6960: grades be determined from: (1) class/lab attendance, participation, and following safety and security procedures (5%) (2) pre lab online assignments (15%); (3) lab assignments (35%); midterm exam (20%); final project (25%).

Your grade will depend in part on the effort of your teammates. Plagiarizing, copying, or otherwise misrepresenting ones' work will not be tolerated and will be dealt with as harshly as permitted under University Policy. Do not break the scientific code of honor.

Final grades are based on the following scale:
> 90 % guarantees an A or A-
> 80 % guarantees a B+, B, or B-
> 70 % guarantees a C+, C, or C-
> 60 % guarantees a D+, D, or D-
< 60% may result in an E

Cutoff points for the specific grades are identified to define reasonable distribution of grades.

Graduate Student Class Project

You will have some flexibility on the type of short project to complete, but it does have to be completed using course resources in a timely and realistic fashion. The project will include an initial proposal (Feb. 11), interim report (Mar 18), and a final poster presentation on Apr. 25. It is expected that the class project will require several hours of effort per week outside of the official class period. This is **not** the sort of project that can be completed in a rush at the end of the semester. The project will be evaluated on the basis of meeting interim milestones, final poster, and your group’s presentation.

ADA Accommodations

The University of Utah seeks to provide equal access to its programs, services, and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability services, 162 Olpin Union Building, 581-5020 (V/TDD). CDS will work with you and the instructor to make arrangement for accommodations. All written information in this course can be made available in alternative format with prior notification to the Center for Disability Services.

Additional Information Regarding Faculty and Student Responsibilities.

 All students are expected to maintain professional behavior in the classroom setting, according to the Student Code, spelled out in the Student Handbook. Students have specific rights in the classroom as detailed in Article III of the Code. The Code also specifies proscribed conduct (Article XI) that involves cheating on tests, plagiarism, and/or collusion, as well as fraud, theft, etc. Students should read the Code carefully and know they are responsible for the content. According to Faculty Rules and Regulations, it is the faculty responsibility to enforce responsible classroom behaviors, beginning with verbal warnings and progressing to dismissal from class and a failing grade. Students have the right to appeal such action to the Student Behavior Committee.

The syllabus is not a binding legal contract. It may be modified by the instructor when the student is given reasonable notice of the modification.