

Environmental Measurement Systems Fall 2008

ATM F693 F01 Environmental Measurement Systems (3)

Examine physical principles of environmental sensors (e.g., temperature, pressure, wind, constituents) develop performance concepts, and explore the principles and practices of environmental measurement systems. Understand the context and limitations of environmental measurements. Class time will allow for field trips to field sites (e.g., satellite facilities, weather balloon launch, air quality monitoring centers). Prerequisites: Graduate standing.

Instructor: Richard L. Collins rlc@gi.alaska.edu
317 IARC (907) 474-7607

Class: Tuesday and Thursday, 2:00 pm - 3:30 pm, Reichardt

Office Hours: TBA.

Required Text: F. V. Brock and S. J. Richardson, *Meteorological Measurement Systems*, Oxford, 2001.
Notes and research material will be introduced regularly and introduced in the class.

- This class focuses on the principles and practices of environmental measurement systems. Environmental measurements increasingly provide a foundation for the environmental models that guide environmental policy. Understanding how well measurements actually reflect the physical environment is critical in employing "real data" in environmental models.
- Students completing the course should have an understanding of the key concepts in how measurements of the environment are made. They should understand the context and limitations of environmental measurements. They should have developed a foundation for research in atmospheric sciences, engineering, environmental sciences, geography, and remote sensing.
- Class material will be presented through lecture, group discussion, and demonstrations.
- Grades will be based on homework, exams, class project chosen by the student, and participation.
- The instructor will work with the UAF Center for Health and Counseling's Disability Services Program (<http://www.uaf.edu/chc/disability.html>, 203 Whitaker Building, 474-7043) to reasonably accommodate students with disabilities.

Grading

The class grade will be based on homework, exams, a final exam a term paper, and participation as follows:

Homework	25%
Term Exam	20%
Final Exam	20%
Class Project	25%
Participation	10%

Attendance

Class attendance is mandatory (see catalog). Material not in the text will be introduced routinely. If you miss a class, extras of handouts are available in a tray outside the instructor's office.

Participation

Participation is based on regular attendance and submitting a full body of work (i.e., attempting all assignments).

Homework

Homework problems will be assigned regularly during the semester and assignments are expected to be neat and legible. No late homework will be accepted without a suitable excuse. You are encouraged to

work independently in study groups. The work you hand in should be your own effort (not merely a copy of another student's work). You are welcome to use the scheduled office hours for tutorial assistance with the homework. If you have questions about a homework problem outside of office hours, contact the instructor by e-mail.

Exams

There will be one term-exam and one final exam. The term-exam will last 90 minutes and the final exam two hours. Students may refer to a single double-sided cheat-sheet in each of the term exams. The final exam will draw on material from the entire semester. In the final exam students may refer to the two term exam cheat-sheets and one new cheat-sheet.

Class Project

There will be a class project required of each student based on a topic selected by the student. The class project should be based on analysis of a particular environmental measurement system. The student can base their class project on an experiment they have conducted or a review of published work in the field. Students are required to make a class presentation of their project.

Plagiarism and Academic Integrity

Students are expected to submit their own original work. Students should reference all other work with appropriate reference and citation. Students are subject to the code of conduct http://www.uaf.edu/catalog/catalog_07-08/academics/regs3.html#Student_Conduct.

Sample Schedule

Specific Topics and choice of instruments will be determined in consultation with students.

<i>Week 1</i>	Functional Model of Instruments, Instrument Standards, Instrument Integration
<i>Week 2</i>	Human Aspects of Measurement and Quality Assurance
<i>Week 3</i>	Measurement of Pressure
<i>Week 4</i>	Measurement of Temperature
<i>Week 5</i>	Measurement of Water Vapor and Constituents Class Projects Assigned
<i>Week 6</i>	Static Performance
<i>Week 7</i>	Midterm Exam
<i>Week 8</i>	Dynamic Performance
<i>Week 9</i>	Measurement of Wind
<i>Week 10</i>	Upper Air Measurements Field Trip to Weather Service
<i>Week 11</i>	Remote Sensing Techniques
<i>Week 12</i>	Remote Sensing Techniques
<i>Week 13</i>	Satellite-Based Measurements Field Trip to Alaska Satellite Facility
<i>Week 14</i>	Student Presentations
<i>Exam Week</i>	Final Exam and Class Projects Due