

METEOROLOGICAL INSTRUMENTS

ATMS 320

FALL 2017

PURPOSE

Observations provide the backbone for the science of meteorology. Regardless of your intended path in the atmospheric sciences, observations of the atmosphere will surely influence your career. So that you can properly interpret observations in your endeavors, you must understand the physics and limitations of common instrumentation.

OBJECTIVES

This course is designed to balance theoretical topics with practical applications. Throughout the course, you will demonstrate knowledge of the elements of modern instrumentation by meeting several course objectives. You will 1) design an instrumentation system to address unique needs, 2) evaluate the utility of certain instruments in a variety of situations, 3) assess the positive and negative characteristics of instrumentation sites, 4) demonstrate knowledge of concepts involved in making careful measurements, 5) interpret instrumentation specifications, and 6) identify sensor limitations and major error sources.



PROFESSOR

Dr. Christopher Godfrey

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Office hours: 2:45–3:45 p.m. Tuesday and Thursday, or by appointment. If my door is open at any other time, please drop in.

CLASS INFORMATION

Meeting times: MW 2:00–3:15 p.m.

Location: Robinson Hall, room 238

Required text: Brock, F. V., and S. J. Richardson, 2001: *Meteorological Measurement Systems*. Oxford University Press, 290 pp. (ISBN: 0-19-513451-6)

Website: <http://www.atms.unca.edu/cgodfrey/courses/atms320/>

» Please visit <http://www.atms.unca.edu/slos.shtml> for a list of the student learning outcomes for the Department of Atmospheric Sciences.

GETTING QUESTIONS ANSWERED

I will be in my office during scheduled office hours, but if at any other time you have a question and my office door is open, you are more than welcome to visit. Otherwise, e-mail is by far the best way to reach me and you will usually get a speedy reply. You may also schedule an appointment with me. Please don't hesitate to ask questions about class, other coursework, or the stresses of college life whenever the need arises.

PREREQUISITES

Prerequisites include either ATMS 103 or 113. The atmospheric thermodynamics and statics course (ATMS 305) is a pre- or corequisite for this course. Many of the topics in this course will build upon the concepts covered in ATMS 305.



IMPORTANT DATES

Wednesday, 13 September 2017	Project summary due	5:00 p.m.
Monday, 2 October 2017	Background/references due	5:00 p.m.
Wednesday, 4 October 2017	Exam I	In class
Wednesday, 1 November 2017	Draft research description/draft budget due	5:00 p.m.
Wednesday, 8 November 2017	Exam II	In class
Monday, 4 December 2017	Project proposal due	5:00 p.m.
Wednesday, 13 December 2017	Final Exam*	11:30 – 2:00 p.m.

*No student, including graduating seniors, may take the final exam at an earlier time.

LABORATORY EXERCISES

On the course schedule below, you will note four class periods with laboratory exercises. The visit to the CRN site will be off campus and will involve both a site survey and an inventory of the instruments at the site. I will try to return you to campus by the end of the class period, but please plan for the possibility that the class may take a bit longer. While the remaining exercises will take place on campus, you may also want to plan extra time to complete these other activities. I will provide instructions for each laboratory, outlining the procedures and requirements for your lab reports. You must **read these instructions before you come to class** so that you can ask relevant questions and make the most efficient use of your time.

COURSE SCHEDULE

With the exception of examination dates and labs, this course schedule is approximate and subject to modifications. If necessary, a revised reading schedule will be posted on the class Web page.

Date	Topic	Reading
21 August	Solar eclipse–No class	
23 August	Modern measurement systems	Chapter 1, Section 13.4
28 August	Modern measurement systems	
30 August	Site selection, Barometry	Chapter 2
4 September	Labor Day–No class	
6 September	Lab: Visit to CRN site	Lab materials
11 September	Barometry	
13 September	Basic electronics	Appendix D
18 September	Basic electronics	
20 September	Static performance characteristics	Chapter 3
25 September	Lab: Basic electronics	Lab materials
27 September	Static performance characteristics	
2 October	Static performance characteristics	
4 October	Exam I	
9 October	Fall Break–No class	
11 October	Thermometry	Chapter 4
16 October	Thermometry	
18 October	Thermometry	Appendix B
23 October	Precipitation measurements	Chapter 9
25 October	Hygrometry	Chapter 5
30 October	Lab: Rain gauge calibration (RRO 242)	Lab materials
1 November	Dynamic performance characteristics	Chapter 6
6 November	Dynamic performance characteristics	
8 November	Exam II	
13 November	Dynamic performance characteristics	
15 November	Upper-air measurements	Chapter 12
20 November	Lab: Weather balloon launch	Lab materials
22 November	Thanksgiving holiday–No class	
27 November	Anemometry	Chapter 7
29 November	Anemometry	
4 December	Radiation; Project proposal due	Chapter 10
13 December	Final Exam	11:30–2:00 p.m.



EVALUATION

There will be two preliminary exams and a comprehensive final exam to assess your progress through the semester. The preliminary exams will take place during regular class meeting times. Several problem sets will strengthen your skills and reinforce the lecture and reading material. Four classes will be devoted to laboratory exercises, with a laboratory report due 5–7 days later. Your participation in the class’s observations for the CoCoRaHS network will count as a lab grade. A final project will allow you to put it all together (complete project instructions will be described separately).

There will be no opportunities for make-up labs or exams. Exams must be taken, and labs completed, on the scheduled date. The *only* exceptions to this rule are: (1) serious medical condition (illness or injury) of you or an immediate family member; (2) University excused absence; (3) jury duty; or (4) military orders. Only in such instances will an item be dropped or rescheduled depending on your best interests, but *only if I am notified at least 24 hours in advance*. Except under the circumstances described above, **problem sets and lab reports are due at 4:00 p.m.** on the scheduled due date. This will allow you to run home and get your completed assignment if you forgot it! I will accept assignments up to 24 hours late (4:00 p.m. the following day) for a 50% late penalty. *Assignments more than 24 hours late will not be graded.* In the event of an unforeseen circumstance that causes you to miss an exam, lab, or problem set due date, *you must notify me by phone or e-mail within 24 hours of the event.* Appropriate documentation must accompany any excused absence and should be attached to a late assignment.

GRADING

Preliminary Exams	25%
Labs	20%
Problem Sets	25%
Project	15%
Final Exam	15%

I reserve the option to curve the final grades upward at my discretion. However, you are guaranteed *at least* the following based on your final score before applying any curve:

A	≥92.0%	C	72.0–77.9%
A-	90.0–91.9%	C-	70.0–71.9%
B+	88.0–89.9%	D+	68.0–69.9%
B	82.0–87.9%	D	60.0–67.9%
B-	80.0–81.9%	F	<60.0
C+	78.0–79.9%		



Final grades are not negotiable. If you see a problem with any other grade, you may plead your case no later than 14 days from the date I return the assignment to the class. I do make mistakes. Under no circumstances will your grade be *lower* if you see me with a question.

ACADEMIC INTEGRITY

Since the point of this or any class is to learn, you may collaborate on assignments, but *you absolutely must make sure that you hand in your own work and that you understand the material*. Copying your friend’s answers will not only be obvious to me, but will result in both of you sharing the credit for that answer. For example, if you do a fantastic job on the assignment and then let three of your friends copy *any part of it*, you will each receive a maximum grade of 25% for the assignment. Any collaboration on exams is simply cheating. I have zero tolerance for academic misconduct and will deal with the problem by immediately filing charges through the regular University channels.

NOTES

University of North Carolina at Asheville is committed to making courses, programs and activities accessible to persons with documented disabilities. Students requesting accommodations and/or academic adjustments must do so through the Office of Academic Accessibility and may be required to provide supporting documentation. All information provided will remain confidential. For more information, please contact the Office of Academic Accessibility at (828) 232-5050 or academicaccess@unca.edu or visit them in the OneStop Student Services Center.