AOS 401: Topics of Meteorology - Meteorological Measurements

2 credits Spring 2017 Friday 1:00-3:00 pm, AOSS 1411

Profs. Ankur Desai <desai@aos.wisc.edu> and Grant Petty <gwpetty@wisc.edu>
Website: learn@uw

Objective

The objective of AOS 401 Meteorological Measurements is for advanced undergraduate and introductory level graduate students in Atmospheric and Oceanic Sciences to gain practical experience in the implementation, quality control, analysis, and presentation of meteorological and climatological observations in a team setting.

Outcomes

By the end of this course, students will have 1) proficiency in setup and deployment of basic surface and profiling meteorological instrumentation, 2) appreciation for the theory of fundamental measurements in atmospheric and oceanic sciences, 3) exposure to more advanced surface layer instrumentation, 4) improved teamwork skills by participating in a hands-on, team-based field project, 5) ability to apply common analysis and hypothesis testing tools for time series observations, and 6) improved technical writing and presentation skills.

Structure

The course is divided into three parts. The first part will have a mix of lecture and lab-based introduction to theory of measurement, including hands-on practice in instrument set up, data logging, and calibration. The second part will involve the execution of a field project, including logistical coordination, team planning, field deployment, and data ingest. Participation in at least two group field activities is mandatory. The overall project will be pre-determined by the instructors, and students will select specific sub-questions and formulate experimental design. Location will normally be in Wisconsin. The final part of the course will include analysis of data, writing, and presentation of results in a single group paper.

Prerequisites

Junior, senior, or graduate student standing in AOS, with preference for senior and first or second year graduate. Non-AOS students allowed on limited basis with instructor consent. Students must be willing to work outdoors in field settings outside of classroom hours for at least 5 days over the course of two trips. Some students must be able to gain driver authorization for use of UW fleet vehicles.

Assessment

Participation (60%) - As a group class, participating in class exercises, lab work, field work, planning, and analysis. This will be graded on a letter grade basis (A, AB, B, BC, C, D, F)

Final paper and presentation (40%) - Students will write a single group scientific manuscript, with each student assigned a section for analysis, writing, and presentation. This will be graded on a letter grade basis that will combine overall class grade (50%) and individual component grade (25% paper, 25% presentation).

Textbook

No required textbook. Most material will be posted on the course website or a group collaborative application. Some physical copy handbooks, manuals, and general guides are available on reserve at the SSEC Schwerdtfeger Library on the 3rd Floor.

Calendar

INTRO/LAB
1/20 Goals of course, goal of experiment
1/27 Theory of basic met measurement
2/3 Calibration and operation of tripods
2/10 Eddy covariance and other instruments

FIELD PROJECT
2/17 Plan experiment design
2/24 Discuss logistics, work on instruments
3/3 **FIELD TRIP: March 2 – March 4**
3/10 Plan for analysis, more theory of measurement
3/17 Advanced instrument discussion

3/24 SPRING BREAK (**OPTIONAL FIELD TRIP March 23-24**)

ANALYSIS
3/31 Data analysis, Python tutorial
4/7 **FIELD TRIP: April 6 – April 8**
4/14 Analysis / Writing
4/21 Writing
4/28 Final presentations

Accommodation Policy
Campus policy: "We believe in the right of all students who are enrolled at the University of Wisconsin-Madison to full and equal educational opportunity. Disability should not be the basis for exclusion from educational programs. All students are entitled to an accessible, accommodating, and supportive teaching and learning environment. … Students are expected to inform faculty, in a timely manner, of their need for special instructional accommodations."
Students requiring class accommodations due to a learning or physical disability must present documentation from the McBurney Disability Resource Center (http://www.mcburney.wisc.edu/) in the first week of class. Accommodations will be made in consultation with the McBurney Center.

Students who require temporary accommodations due to medical or psychological reasons should acquire documentation from University Health Services. Counseling is available from Counseling Services, University Health Services (http://www.uhs.wisc.edu/).