

Course Syllabus

Spring 2012

ECE/METR 5683: Weather Radar Applications

- Instructor:** Prof. Phillip Chilson (chilson@ou.edu)
Office: NWC 4618, 325-5095
Office Hours: Contact me about scheduling a time or simply come by whenever my door is open
- Time:** MWF, 15:00-15:50
- Location:** NWC 5930
- Recommended Text:** *Doppler Radar and Weather Observations, 2nd Ed.*, R. J. Doviak and D. S. Zrnic, 1993
(for ECE students) *Severe and Hazardous Weather, 2nd Ed.*, R. M. Rauber, J. E. Walsh, and D. J. Charlevoix, 2005
- References:** *Radar Meteorology*, Henri Sauvageot, 1992
Radar Observations of the Atmosphere, Louis J. Battan, 1973
Radar Meteorology, S. Raghavan, 2003
Weather Radar, Peter Meischner (Ed), 2004
Radar in Meteorology, D. Atlas (Ed), 1990
Radar and Atmospheric Science, R. M. Wakimoto and R. C. Srivastava (Ed), 2003

Course Information

Overview: A variety of methods will be presented and discussed to assist the student in identifying meteorological structures using weather radars and related instruments. A general introduction to the interactions of electromagnetic waves in a geophysical medium will be given. In particular, scatter from hydrometeors and refractive index variations will be explored. The course covers such topics as quantitative precipitation estimation and wind retrieval methods, and phased array applications. Current and archived data from NEXRAD and surface stations will be processed using various visualization and analysis tools. Students will also be introduced to the treatment of clear-air radar echoes and the retrieval of winds under non-precipitating conditions.

Several lectures will be given by local researchers on related topics:

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| Terry Schuur | Dual-polarimetric weather radar background |
| Jian Jhang | Integrated NEXRAD observations |
| Jerry Brotzge | CASA radar network and observations |
| Don Burgess | weather radar observations of weather systems |
| Pam Heinselman | Phased array weather radar and observations |
| Valliappa Lakshmanan | Storm identification and tracking |
| David Bodine | Dual-polarimetric signatures of tornadoes |
| Tian Yu | Spectral signal processing of weather radar data and tornadoes |
| Rodger Brown | Interpreting Doppler velocity patterns |
| Alan Shapiro | Single- and dual-Doppler radar wind retrievals and advection correction |

The schedule is available through the course web page on D@L (see next page)

Assignments

Modules: Three to four *programming-based* modules will be assigned. These modules will focus on real-world applications and require data analysis completed using software such as MATLAB or Python. For some exercises, it will be necessary to complete part of the assignment using MATLAB. For each module you will be asked to process the data, present and explain results, and provide any code used during the exercise.

Literature Review: Students will be asked to critically evaluate several scientific journal articles on topics related to weather radar and weather radar analysis. They will then be asked to provide an oral summary of the literature review to the class. This will be completed in groups.

Project: As part of the course, students will form teams of 3-4 people and work together to prepare a mock research proposal related to weather radar in response to request for proposals. Each group will be asked to i) provide a letter stating your intent to submit a research proposal on a topic of your choosing, ii) submit a white paper summarizing the work to be done, iii) submit a fully developed research proposal, iv) review 2-3 proposals from other teams, and v) give an oral presentation of the proposal topic. More description of the project will be provided during the semester.

Grading

Modules:	25%
Literature Review:	25%
Project:	50%

Policies / Administrative

Academic Honesty: Homework assignments are important for your understanding of the material. Occasional help from a classmate is fine but be sure that you actually understand the material. It will help tremendously for you to come visit me in my office hours. Realize that simply copying a homework assignment from any source is considered cheating and will definitely not help your understanding. If caught, such activity could result in a failing grade in the course and possible disciplinary action. All students are expected to be familiar with and abide by the OU Academic Misconduct Code. Information on this code and other student policies is located at <http://studentconduct.ou.edu/>.

Reasonable Accommodation Policy: 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 Office of Disability Services prior to receiving accommodations in this course. The Office of Disability Services is located in Goddard Health Center, Suite 166, phone 405-325-3852 or fax only 405-325-4173.

Class Homepage

The class home page will be administered through Desire2Learn

<https://learn.ou.edu/>

Materials and announcements will be posted on the **combined page**

ECE/METR-5683-001 - Weather Radar Applications

It is important that you check the web page regularly for new class material, postings, and other course related information.