SYLLABUS

MET 628 Radar Meteorology Fall Semester 2013

Professor: Michael Bell
Email mmbell@hawaii.edu, Phone 956-2878
Time and Location: MWF 1:30-2:20 in HIG 310
Office Hours: MWF 11:30 - 12:20, or by appointment
First day of instruction 8/26/13, last day of instruction 12/11/12.

Student Outcomes: Understand the history, theory, hardware, and use of radar for meteorological applications. Weather radar is one of the few tools capable of obtaining high resolution wind and precipitation measurements over a broad area through remote sensing. During this course students will develop skills in understanding, interpreting, and using radar observations for meteorological research and operational forecasting.

Outline By Week
1. Introduction to weather radar hardware and technology (antennas, transmitters, and receivers)
2. Theory of polarimetric electromagnetic wave propagation, scattering, and attenuation from distributed targets (precipitation, Bragg, insects)
3. Radar equation derivation and analysis for point targets
4. No class (AMS Conference on Radar Meteorology)
5. Radar equation continued for distributed targets
6. Radar moment calculations (dBZ, Velocity, SW)
7. Polarimetric variables (ZDR, RhoHV, KDP, LDR)
8. Precipitation estimation (QPE) and particle identification
9. Mobile radars (vehicular, airborne, and space-borne radars)
10. Single-Doppler wind retrieval techniques (VAD, VTD, GBVTD)
11. Multi-Doppler wind retrieval techniques
12. Severe weather applications (tornados, squall lines, and hurricanes)
13. Clear-air applications (wind profilers, Bragg scattering, turbulence)
14. Advanced signal processing (clutter filtering, dual PRF/PRT, phase coding)
15. Radar data assimilation techniques (3DVAR, EnKF)
16. Advanced and future radar technologies (phased array, solid state)
17. Final class presentations

Instructor may modify this schedule to discuss subjects relevant to current weather events (like hurricanes) or to shuffle the order in which material is presented. Every opportunity will be made to integrate current observations into the course with practical (hands-on) labs and homework assignments.
Text: Course materials will be provided for each lecture. The references below will be used by the instructor to supplement lectures.

References:


Grading

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Homework and Lab Assignments</td>
<td>40% W</td>
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<tr>
<td>Exams (15% each)</td>
<td>30% W</td>
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<tr>
<td>Research paper &amp; final oral presentation</td>
<td>30% W</td>
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<td>Total</td>
<td>100% W</td>
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Special dates for Fall 2013:
• No class Labor Day 09/02
• No class the week of 09/13-09/20
• 1st half exam tentatively 10/18
• DOW Radar arrives 10/24 (Potential daily operations until 11/15)
• No class on 10/25 for SOEST Open House
• No class, but possible radar operations Veteran’s Day 11/11
• DOW Radar leaves 11/15
• No class for Thanksgiving 11/29
• 2nd half exam tentatively 12/11
• Final Presentations the week of 12/16 (Finals week)