ECE 510 Instrumentation and Sensing Study Guide #3 18 January 2016


Introduction to the Lab Modulated Scatterer Radar.

More detail on scattering cross section. Introduction to the modulated scatterer cross section $\sigma_m$ and intelligent modulated scatterer cross section $\sigma_{mi}$ for our class targets.

Classic instrumentation and Sensing: modulated RF signal generators and the HP-415 instrument used in the electromagnetics lab.

The deployment environment: tracking surface water with oil. Thin oil, thick oil, basic chemistry. Experiments in the kitchen.

Design Topic for this week: Continued CMOS 555 timer and microwave diode to build a cooperating radar target. Considerations for floating deployable targets.

Study materials on the web page:

CMOS 555 Timer data sheet
Microwave Diode data sheet

Continued basic antenna theory for modulated scatterers: halfwave dipoles, quarter wave monopoles, reflectors, and a sketch of image theory.

The relationship between size and gain of simple antennas.

Review course outcomes and evaluation criteria.

This graduate class is a Design Team focused on concept, sketch, design, build, measure, redesign, and deployment of a working system to remotely track the drift of oil on water in the natural environment. The individual tasks are diverse, and will offer multiple opportunities for a highly variable set of contributions, based on individual student interests and capabilities. We have 9 weeks left, and will not spend much of it on traditional exams.