ECE 784: Selected Topics in Microwave Systems: Microwave Remote Sensing

Department of Electrical & Computer Engineering
University of Massachusetts
Fall 2016

This course provides an overview of fundamental concepts in the remote sensing of the environment at microwave frequencies. Topics include the concepts of blackbody radiation and radiative transfer, microwave radiometry and radiometer systems, microwave scattering from natural surfaces and volumetric targets, polarimetry, radar applications and systems. Special emphasis will be given to applications in meteorology.

Time & Place

MW 2:30 pm – 3:45 pm in Hasbrouck Lab Addition 104A

Stephen J. Frasier

Knowles Engineering Bldg., Rm. 113A
tel: 545-4582 (-4652, fax)
email: frasier@umass.edu (Note: please put ECE-784 in the heading)
office hours: by appointment.

Prerequisites:

Basic EM analysis (plane waves) and microwave engineering, basic (undergraduate background) in signal processing, probability theory.

(Optional) Texts:

Microwave Radar and Radiometric Remote Sensing, F.T. Ulaby and D.G. Long, U. Michigan Press, 2014.

Doppler Radar and Weather Observations, R.J. Doviak and D.S. Zrnic, Dover reprint of 2nd ed., Academic Press, 1993.

Grading:

Midterm: 30%
Final: 30%
Homework: 20%
Project: 20%

Homework will be assigned periodically during lectures. Project will entail reviewing the literature on a particular topic in microwave remote sensing, writing a brief review paper, and giving an oral presentation.

ECE 784 Microwave Remote Sensing – Fall 2016
Preliminary Schedule

Week	Date	Topic
1	W Sep 7	Blackbody radiation
2	M Sep 12	Radiative Transfer
3	M Sep 19	Radiometer Systems
4	M Sep 26	Passive Remote Sensing
5	M Oct 3	Radar Fundamentals
6	T Oct 11	Scatterometry
7	M Oct 17	Microwave Polarimetry
8	M Oct 24	Midterm
9	M Oct 31	Meteorological Radar
10	M Nov 7	Meteorological Signal Processing
11	M Nov 14	Signals of Opportunity; no class W 16
	M Nov 21	* Thanksgiving Break *
12	M Nov 28	Wind/Temp Profiling & Sounding
13	M Dec 5	Presenations
14	M Dec 12	Presentations