ECE 584 Microwave Engineering I

Fall 2017: ELAB 323, 1:00-2:15

The course website can be found on Moodle

A forum website will be set up on Piazza

Homework will be turned in on Gradescope

Instructor: Paul Siqueira
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siqueira@umass.edu
Office Hours: Monday 1-3 pm, 9-11 am Thurs, or by appointment

Teaching Assistant: Jezabel Vilardell Sanchez, Marcus 209, Th & F, 2:30 – 3:45

Labs: Room 6, Marcus (in the basement). There are six labs, they will begin in late September.

Electromagnetic Theory, Chapter 1: Sept 5, 7, 12, 14, 19
Maxwell's equations, boundary conditions, the wave equation, energy and power, image theory

Transmission Line Theory, Chapter 2: Sept 21, 26, 28, Oct 3
Lumped element equivalent, field analysis, the Smith chart, impedance mismatches

Transmission Lines and Waveguides, Chapter 3: Oct 5, 12, 17, 19
TEM, TE and TM waves, Parallel plate waveguide, Rectangular waveguide, Coaxial lines, stripline and microstrip

Midterm: Friday, October 20, 7-9 pm, Location is Lederle Graduate Research Tower, Room 201.

Microwave Networks, Chapter 4: Oct 24, 26, 31 Nov. 2, 7, 9
Equivalent voltages and current, impedance, admittance, scattering and ABCD matrices, source functions for waveguides.

Impedance Matching and Tuning, Chapter 5: Nov. 14, 16, 28, 30
Lumped element, single stub and double stub tuning, multisection matching transformers.

Microwave Resonators, Chapter 6: Dec 5, 7, 12
Series and parallel resonant circuits, transmission line resonators, waveguide cavity resonators, dielectric resonators.

Final: Thursday, December 14, 10:30 am – 12:30 pm. ELAB 323

Grading: 25% laboratory
15% homework sets
30% midterm
30% final

Course Objectives and Outcomes for ECE 584, Fall 2017

Objectives: Students completing this course will know

1. how to apply Maxwell's equations to various canonical situations for free space, waveguides, and cavity resonators
2. how to characterize microwave systems and components in terms of network theory (Scattering matrix, ABCD matrix, impedance matrix, etc.)
3. how to analyze and design tuning networks and matching transformers for microwave systems
4. how to make fundamental measurements related to microwave engineering (VSWR, S-parameters, etc.)
5. how to interpret and manipulate graphical representations of microwave components and systems via the Smith chart.

Professional Component: Credits of engineering science: _3_, Credits of design: _1_

Relationship of course objectives to program outcomes:

PROGRAM OUTCOMES	COURSE OBJECTIVES				
	1	2	3	4	5
1. Well grounded in the fundamental concepts of math, physics, chemistry, computer science and engineering science	Y	Y	Y	N	N
2. Able to identify, formulate and solve problems in ECE	Y	Y	Y	Y	Y
3. Able to design and conduct experiments, and to analyze and interpret measured data	N	N	N	Y	N
4. Capable of designing analog and digital systems, components, and processes to meet desired needs	N	Y	Y	Y	Y
5. Proficient in using modern engineering techniques and computing tools for effective engineering science	N	N	Y	Y	Y
6. Experienced in engineering teamwork and solving technically diverse problems	N	N	N	Y	N
7. Able to communicate effectively orally and in writing and through symbolic and graphical expression	N	N	N	Y	Y
8. Aware of professional and ethical responsibilities as engineers	N	N	N	N	N
9. Aware fo the impact of ECE technology and decisions on society	N	N	N	N	N
10. Motivated about the importance of lifelong learning and professional development	N	N	N	N	N