



E8241 Jan 2:1

Radio Frequency Integrated Circuits & Systems

Instructor

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Email:

Department: ECE

Course Time:

Lecture venue:

Detailed Course Page:

Announcements

Brief description of the course

The topic of this course emphasizes on developing new ideas that would significantly improve the performance of RF, microwave and millimeter wave components. With the widespread interest in RF ICs, demand for training in this area is also increasing. Understanding of the design theory and underlying techniques are of equal importance in mastering the topic. Considering that there is a specialized course on CMOS, these topics will not be covered in this course.

Course will have Lab component involving design of some basic passive circuits with industry standard softwares and their fabrication and testing. In addition students undertake a projectwork that may involve designing, building and testing a subsystem or component, based on recent literature.

Prerequisites

None

Syllabus

Review of Transmission line Theory, terminated transmission lines, smith chart, impedance matching,

Microstrip and Coplanar waveguide implementations, microwave network analysis, ABCD parameters, S

parameters, X parameters.

Behavior of passive components and networks, resonant structures using distributed transmission lines, power dividers, couplers and filters; CRLH transmission line based components.

Introduction to planar microwave antennas, definitions and basic principles, Smart antennas; Link plan and propagation studies

Basics of high frequency amplifier design, biasing techniques, simultaneous tuning of 2 port circuits, noise and distortion, linearity, noise and large signal performance, Power amplifier design,

Course outcomes

Understand why/how RF circuit design differs from others, Learn to design and analyse RF circuits, Exposure to industry standard tools for RF circuit design, and Learn Vector Network analyzer based measurement of circuit components and antennas.

Grading policy

This is usually a small class and hence grades are awarded based on absolute scores: 35% final examination, 15% final project, 25% mid-term tests and 25% assignments.

Assignments

Resources

DM Pozar Microwave and RF Wireless Systems

TH Lee The design of CMOS Radio Frequency Integrated Circuits

R.E. Collin Foundations for Microwave Engineering John Wiley

C.A. Balanis, Antenna Theory: Analysis and Design, John Wiley

K Chang Radio Frequency Circuit design