

## **ELEC 6130/6136 - RF DEVICES AND CIRCUITS**

2002 Catalog Data: **ELEC 6130/6136. RF DEVICES AND CIRCUITS** (3). Pr., ELEC 3700. Introduction to RF semiconductor devices and circuits targeted for wireless applications.

Text: *RF Microelectronics*, B. Razavi, Prentice Hall, 1998.

Coordinator: Richard C. Jaeger, Distinguished University Professor

Goals: This course provides an introduction to the technologies, devices, and circuits for wireless applications.

Prerequisites by Topic:

1. Introductory analog integrated circuits
2. Basic electromagnetic theory

Topics:

1. Introduction: wireless applications and device/circuit requirements (2 classes)
2. RF IC Technologies: Bipolar, CMOS, and MESFET technologies (4 classes)
3. RF Device Fundamentals (6 classes)
4. Device Performance Metrics (3 classes)
5. RF Transceiver Architectures (3 classes)
6. IC Building Blocks for RF Systems (3 classes)
7. Low Noise Amplifiers (5 classes)
8. Mixers (5 classes)
9. Oscillators (6 classes)
10. Power Amplifiers (6 classes)
11. Tests (2 classes)

Typical Methods for Evaluating Student Performance:

- Homework (20%)
- Tests (40%)
- Team design project: (40%)

Typical Grading Scale:

A: 90-100%  
B: 80-89%  
C: 70-79%  
D: 60-69%  
F: 0-59%

Course Design Project: Design of a simple RF circuit block including topology selection and circuit simulation.

Class attendance: Class attendance and its effect on course grade is the prerogative of the individual instructor and will be part of the course outline and announced the first day of class.

Policy on unannounced quizzes: Unannounced quizzes and their effect on course grade are the prerogative of the individual instructor and will be part of the course outline and announced the first day of class.

ABET category content as estimated by faculty member who prepared this course description:

Engineering science: 1.5 credits or 50%  
Engineering design: 1.5 credits or 50%

Students who need special accommodations should make an appointment to discuss their needs as soon as possible.

Justification for Graduate Credit:

Generally graduate students majoring in digital as well as traditional analog electronics are not familiar with RF and "wireless" electronics. They are used to systems characterized by input signals, typically voltages, and the resulting output voltages, whereas in RF electronics systems are described by available input power and output power. Given the popularity of RF and wireless communications and the multi-discipline nature of today's RF design, it is desirable to have our graduate students working in areas of electron device physics, digital, analog and packaging take an introductory courses on RF electronics. The course will make those non-RF major graduate students comfortable with basic RF design when they are involved with RF related research topics.

Prepared by: Richard C. Jaeger

Date: 10/29/2001