

**University of Massachusetts
Department of Electrical and Computer Engineering
Amherst, Massachusetts 01003**

**ECE 683 Active Microwave Circuits (3credits)
Spring 2019**

- Instructor:** Professor Robert W. Jackson, 215K Marcus Hall
- Instructor Contact:** Phone: (413) 545-1386
email: jackson@ecs.umass.edu
- Office Hours:** Tuesday, Thursday 3:30-4:30
- Lecture Schedule:** Tuesday, Thursday 8:30-9:45, ELAB 327
See attached detailed schedule
- Course Synopsis:** This course presents theory and techniques used in the design of modern microwave active circuits used for communications and sensing. Topics include high dynamic range amplifiers, power amplifiers, mixers, and oscillators.
- Prerequisites:** Microwave Engineering I (ECE 584) or equivalent
- Course Requirements:**
- (1) Homework (25%) - 9 assignments many of which will require the use of basic features in microwave CAD software similar to Ansoft Designer, Agilent ADS, HSPICE.
 - (2) Midterm Exam (30%)
 - (3) Final Exam (45%)
- Primary Reference:** Instructor's Course Notes
- Additional References:**
- (1) *RF Microelectronics* (2nd Edition), B. Razavi
 - (2) *Microwave Engineering*, Pozar.
 - (3) *The Design of CMOS Radio-Frequency Integrated Circuits*, T. H. Lee, Cambridge University Press, 2004

Lecture Schedule

| Lecture # | Topic |
|------------------------------------|---|
| 1 | Introduction, S, Y, Z parameter Review <i>Homework I assigned</i> |
| 2-3 | Two Port Stability <i>Homework II assigned</i> |
| 4-5 | Gain Definitions |
| 6 | Narrow Band Design <i>Homework III assigned</i> |
| 7 | Circuit Modeling of Microwave Devices & Figures of Merit <i>Homework IV assigned</i> |
| 8-11 | Noise Analysis & LNA Design |
| 12-14 | Distortion, Dynamic Range & Design <i>Homework V assigned</i> |
| Mid Term Exam Lectures 1–11 | |
| 15-17 | Power Amplifiers & Design <i>Homework VI assigned</i> |
| 18-21 | Mixers, Conversion Matrix, Noise, Image Reject <i>Homework VII assigned</i> |
| 22-25 | Oscillators and Oscillator Noise <i>Homework VIII assigned</i> |