EEE 213 : MICROWAVE DEVICES AND CIRCUITS

Indicate Required or Elective Course here Elective **Date:** Enter 02/28/2007

Indicate Course Area here Communications

Course Coordinator: B.P. Kumar

Catalog Description:

EEE 213. Microwave Devices and Circuits. Theory and application of electromagnetic radiation at microwave frequencies; study of microwave impedance and power measurement and characteristics of microwave circuit components, and electronic devices. 3 units.

Prerequisites: EEE 162 or equivalent.

Text: 'Microwave transistor amplifiers, Analysis and Design' by G. Gonzalez, 2nd Edition, Prentice Hall.

Additional Resources:

References: 'Microwave Engineering' by David M. Pozar, 2nd Edition, John Wiley and Sons.
Agilent-EEsof Advanced Design System (ADS) Manual.

Course Objectives:

This course covers mainly active microwave devices, used in the generation and amplification of signals in the frequency range of 1-20 GHz. Specifically, the course gives students an in-depth knowledge of the design, simulation, fabrication and measurement of microwave amplifiers and oscillators, which are matched for peak response at a specific center frequency. Effects of noise on the gain and overall performance of these devices is also considered in this course.

Prerequisites by Topic:

1. Basic Electromagnetic Theory
2. Network Parameters such as [Z], [Y], ABCD.
3. Transmission Line theory

Topics Covered:

1. Active Microwave device theory such as tubes and transistors.
2. Design and fabrication of matched microwave amplifiers.
3. Design and fabrication of microwave oscillators.

Evaluation:

Midterm I:	20%
Midterm II:	20%
Finals:	30% (comprehensive)
Homework:	10%
Projects:	20%

Contribution of Course to the Professional Education Component: Indicate how this course fulfills this ABET requirement (e.g., developing student's analytical and critical-thinking skills, science and design content, etc.) **Note: This section is not required for graduate courses**.

Relationship of Course to Program Outcomes: Indicate how this course fulfills this ABET requirement (e.g., knowledge of mathematics, engineering science, core topics in major, development of problem solving skills, etc.) **Note: This section is not required for graduate courses**.

Course Outline/Schedule

Week	*Topic*	*Text Reference*
1	Review: 2-port analysis, S parameters, Smith Charts	Ch. 1,
2	Microwave transistors	Ch. 1
3	Microwave tubes	Handouts
4	Review of matching networks	Ch. 2
5	**Review and Midterm 1**	
6	Microwave amplifier design	3
7	Microwave amplifier design	3
8	**Amplifier lab**	
9	Noise analysis	4
10	Microwave oscillator design	5
11	Microwave oscillator design	5
12	**Review and Midterm 1**	
13	**Oscillator Lab**	
14	**Lab completion**	
15	**Course review**	