**ELEN 4110 ‑ Microwave Engineering**

**Course Description:**

Fundamentals of microwave engineering are studied in this course. Numerous microwave components, electrical models, and circuit realizations will be discussed. Microwave network analysis using scattering parameters are presented. The course will address system-level concepts. Typical microwave instrumentations will be discussed.

**Prerequisites:** ELEN 3120 with a minimum grade of C

**Selected Elective** in the Electromagnetic Fields and Communication area.

**Course Materials:**

**Required:** Microwave Engineering, 4th Edition by D. Pozar

**Course Goals:**

To provide electrical engineering students the foundation knowledge and skill sets to function as microwave engineers and to prepare the students for additional microwave, electromagnetics, and communications studies.

**Course Objectives**

*By the end of this course, you should be able to....*

1. have a working knowledge of scattering parameters;
2. be able to analyze thermal noise levels within a system;
3. be familiar with the following microwave components and performances: amplifiers, attenuators, power dividers, directional couplers, filters, isolators, circulators, bias Tees, impedance transformers and mixers;
4. be able to create signal link budgets and noise link budgets;
5. be able to analyze and design microwave systems such as transmitter systems and receiver systems;
6. be familiar with commonly used transmission lines and systems;
7. understand antenna specifications from the perspective of a system designer;
8. understand the operation of microwave spectrum analyzers and network analyzers.

**Course Topics: In the text**

Transmission Lines and Waveguides Chapter 2, 3

Microwave Network Analysis Chapter 4

Impedance Matching and Tuning Chapter 5

Power Dividers and Directional Couplers Chapter 7, 8

Active Microwave Circuits and Noise Chapter 10

Oscillators and Mixers Chapter 11

Introduction to Microwave Systems Chapter 12

**Class Schedule:** 3 Credit course, meeting the equivalent of 3-50 minute class periods per week.

**Contribution to Professional Component:** Engineering Science 70 %

Engineering Design 30 %

**Contribution to Program Objectives:** partial fulfillment of Criterion 3 objectives A, B, K

**Course Coordinator**: James E. Richie

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