

## **Fall 2017 - Syllabus**

### **EENG 4980 Engineering Electromagnetics Laboratory**

**Lab meetings** Discovery Park B288, Thursday 5:30 pm – 8:20 pm

**Description:** Introduction to the basic Radiofrequency measurement equipment, lab experiments illustrating the basic principles of electromagnetics.

**Prerequisite(s):** EENG 2610, MATH 3310 or consent. **Co-requisite:** EENG 3410

**Class/Lab Schedule:** 3 lab hours every week

**Text Book and Other Required Materials:** Notes and laboratory manual would be provided during the lab. A lab report is due in the following week Thursday before the lab session.

#### **Labs:**

Lab 1: Introduction to ADS software (09/07/17)

Lab 2: Tuning and Optimization in ADS (09/14/17)

Lab 3: Harmonic Balance Simulation using ADS (09/21/17)

Lab 4: Planer EM Simulation in ADS: Microstrip Bandpass filter (09/28/17)

Lab 5 Planer EM Simulation in ADS: Microstrip Patch Antenna (10/05/17)

Lab 6: Planer EM Simulation in ADS: EM/Circuit Co-simulation (10/12/17)

Lab 7: Introduction to the Spectrum Analyzer (SA) (10/19/17)

Lab 8: Introduction to the Vector Network Analyzer (VNA) (10/26/17)

Lab 9: Transmission line characteristic impedance (11/02/17)

Lab 10: Dipole Antenna and Balun (11/09/17)

Lab 11: Tuning (11/16/17)

Lab 12: Double stub matching (11/30/17)

Lab 13: Single stub matching (12/07/17)

#### **Course Learning Outcomes (CLO):**

Upon successful completion of this course, the students will be able to:

1. Perform electromagnetic lab experiments including using bench-top instruments such as a Vector Network Analyzer, Spectrum Analyzer and RF Signal Generator.
2. Write technical lab reports, analyze and summarize results.
3. Learn advanced design software to perform electromagnetic simulation and characterization of microwave circuits and antenna.
4. Use MATLAB as a tool to solve for electric and magnetic fields from charges and currents.

#### **ABET Student Learning Outcomes (SO)**

SO-1 Ability to apply mathematics, science and engineering principles.

SO-2 Ability to design and conduct experiments, analyze and interpret data.

SO-3 Ability to design a system, component, or process to meet desired needs.

SO-4 Ability to function on multidisciplinary teams.

SO-5 Ability to identify, formulate and solve engineering problems.

SO-6 Understanding of professional and ethical responsibility.

SO-7 Ability to communicate effectively.

SO-8 The broad education necessary to understand the impact of engineering solutions in a global and societal context.

SO-9 Recognition of the need for and an ability to engage in life-long learning.

SO-10 Knowledge of contemporary issues.

SO-11 Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

CLO	ABET Student Outcomes										
	SO-1	SO-2	SO-3	SO-4	SO-5	SO-6	SO-7	SO-8	SO-9	SO-10	SO-11
1	X	X			X						X
2	X				X		X				X
3	X				X						
4	X				X						X

**Teaching Assistant**

Han Ren, Ph.D. Student

Office B251, Email hanren@my.unt.edu, Office hours: Tuesday and Thursday 2:30 pm – 3:30 pm or by appointment.

**Grade**

Attendance: 10%

Lab Reports: 90%