EENG 3411.001 - Engineering Electromagnetics Lab
Spring 2023

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Instructor Office Hours: By appointment; NTDP B288
TA: Arthur C Depoian II, PhD Student, B251, ArthurDepoian@my.unt.edu
TA Office Hours: By appointment; NTDP B288
Laboratory: Tuesday 5:30pm - 8:30pm; NTDP B288

Corequisite(s): EENG 3410 - Engineering Electromagnetics

Course Description: This course is designed to supplement the material of EENG 3410 and provide practical engineering problem solving experience. Measurement and Instrumentation skills are enhanced through guided investigations of the fundamentals of electromagnetic. The topics covered include transmission lines, sensors, and generation. Providing a deeper understanding of VSWR and an introduction to basic antenna design.

Recommended Text(s):


Course Topics: (tentative)

1. Fields and energies in simple planar, cylindrical, and spherical geometries
2. Fields within conducting, anisotropic, and plasma media
3. Resistors, capacitors, inductors, transformers, transmission lines, and resonators
4. Electric and magnetic forces on charges, wires, and media
5. Electric and magnetic motors and sensor/generators
6. Wire antennas for transmission and reception

Course Objective: Exploration of Electromagnetic theory through application.

Course Learning Outcomes (CLO): Upon successful completion of this course, the students will be able to:

1. Develop a macro understanding of electromagnetic theory:
   • Static and dynamic electromagnetic (EM) fields, energy, and power
   • EM fields and waves within and at the boundaries of media
   • EM radiation and propagation in space and within transmission lines
   • Circuit behavior of simple EM devices and transmission lines
   • EM forces on charges, currents, and materials; mechanically produced fields
2. Connect EM theory to economically important applications:
   - Wireless and wired communications systems
   - Electronic circuits and systems, analog and digital
   - Actuators (motors) and sensors (generators)
   - Acoustic devices and systems

3. Deepen technical skills including:
   - Vector Network Analyzer, Spectrum Analyzer and RF Signal Generator
   - Learning advanced design software to perform electromagnetic simulation
   - Writing technical lab reports

3. Exercise

Grading: Laboratory Participation is Required to Succeed.

\[(0.75 \times \text{Labs}) + (0.25 \times \text{Project}) \times \text{rounddown}\left(\frac{\text{Participation}}{\text{Laboratories}}\right) = \text{Final Grade}\]

Canvas: Course material and grades will be maintained on the course Canvas site. You should check this page often to keep current on important information. https://unt.instructure.com

Course Policies:

- Labs Reports are due at the beginning of class on Canvas. Lab Reports turned in after class will be penalized 25%. No Lab report will be accepted after 1 week.

- Students have one week to contest any grade once graded/returned/posted.

Rights and Responsibilities:

- Students are expected to communicate to the instructor any issue regarding their performance in class ahead of time.

- Students aware of an authorized absence (religious observance, military service, official university function, etc.) should notify the instructor as soon as possible according to UNT Policy 15.2.5.

- Students with disabilities should inform the instructor of their needs at the beginning of the semester according to UNT Policy 18.1.14 in order to receive proper attention and accommodations.

- Cheating and academic dishonesty will not be tolerated. Any student found to have participated in academic dishonesty will receive an F in the class, and may be subject to further disciplinary action. Acts of academic dishonesty include: academic fraud (e.g. changing solutions to appeal a grade), copying or allowing one’s work to be copied, fabrication/falsification, plagiarism, sabotage of others’ work, substitution (e.g. taking an exam for someone else). For more details, see UNT Policy 18.1.16.

- Letter grades will not be assigned until the end of the term, after the final grades have been calculated. Any letter grade assignment posted before the end of the class should be regarded as tentative and subject to change.
- Course Safety Procedures Students enrolled in EMAG LAB are required to use proper safety procedures and guidelines as outlined in UNT Policy 06.038 Safety in Instructional Activities. While working in laboratory sessions, students are expected and required to identify and use proper safety guidelines in all activities requiring lifting, climbing, walking on slippery surfaces, using equipment and tools, handling chemical solutions and hot and cold products. Students should be aware that the UNT is not liable for injuries incurred while students are participating in class activities. All students are encouraged to secure adequate insurance coverage in the event of accidental injury. Students who do not have insurance coverage should consider Standard Syllabus Statements Related Policy 06.049 Course Syllabi Requirements obtaining Student Health Insurance. Brochures for student insurance are available in the UNT Student Health and Wellness Center. Students who are injured during class activities may seek medical attention at the Student Health and Wellness Center at rates that are reduced compared to other medical facilities. If students have an insurance plan other than Student Health Insurance at UNT, they should be sure that the plan covers treatment at this facility. If students choose not to go to the UNT Student Health and Wellness Center, they may be transported to an emergency room at a local hospital. Students are responsible for expenses incurred there.