

EENG 4410/5410 - Microwave Engineering

Fall 2022

Course Description:

This course provides students with fundamental theories, analysis techniques, and widely used devices in RF/microwave engineering as well as hands-on skills with commercial simulation tools used for designing RF/microwave circuits and components. Topics include transmission lines and waveguides, microwave network theory and analysis, impedance matching and tuning, power dividers and couplers, filters, amplifiers.

Learning Objectives:

Upon successful completion of this course, students will:

1. Learn how to apply Maxwell's equations for wave propagation in free space and waveguides
2. Be able to characterize and analyze microwave networks and components using scattering matrix, transmission matrix, impedance matrix, etc.
3. Be familiar with using Smith chart to represent and interpret impedance characteristics of microwave networks
4. Know how to analyze and design impedance matching networks for microwave systems
5. Understand operating principles of some widely used RF/microwave devices (e.g., power dividers, couplers, and filters) and learn how to design them
6. Get hands-on experience with commercial simulation tools widely used for RF/microwave circuit design such as ADS.

Prerequisite: EENG 3410 Engineering Electromagnetics

Lectures: Tuesday & Thursday, 16:00 - 17:20, NTDP B217

Lecture notes and other supplementary materials will be posted on Canvas.

<https://unt.instructure.com/courses/75836>

Instructor:

Hung Luyen. Office: NTDP B232. Email: Hung.Luyen@unt.edu.

Office Hours: Monday & Wednesday, 15:00 - 16:00 or by appointment.

TA: Harshith Nadipalli. Email: HarshithNadipalli@my.unt.edu.

Textbook: (Required)

Microwave Engineering, D. M. Pozar, 4th Edition, John Wiley and Sons Inc., ISBN 978-0470631553.

Grading Policy:

- Attendance and Participation: 5%
- Homework and Lab Assignments: 30%
- Quizzes: 25%
- Midterm Exam: 20% (Date TBD)

- Course Project: 20%

Homework and Lab Assignment Policies:

- There will be about 4 homework assignments and 3-4 lab reports during the semester.
- Homework/Lab assignments are due at the end of class on the due date.
- Late assignments will not be accepted after 24 hours of the submission deadline. A 30% penalty is applied to accepted late assignments.
- It is fine for you to discuss homeworks with your classmates. However, each of you must write and turn in your own answer sheets.

Exam Policies:

- Failure to show up for an exam results in receiving no credit for that exam. In such case, there will be no second chance for you to retake the missed exam, unless under very special circumstances (e.g., family or medical emergency).

General Policies:

• Technical Assistance:

UIT Help Desk: UIT Student Help Desk site (<http://www.unt.edu/helpdesk/index.htm>);

Email: helpdesk@unt.edu; Phone: 940-565-2324; In Person: Sage Hall, Room 130

For additional support, visit Canvas Technical Help (<https://community.canvaslms.com/docs/DOC-10554-4212710328>)

- **Rules of Engagement:** See these Engagement Guidelines (<https://clear.unt.edu/online-communication-tips>) for more information.

- **Course Evaluation:** Student Perceptions of Teaching (SPOT) is the student evaluation system for UNT and allows students the ability to confidentially provide constructive feedback to their instructor and department to improve the quality of student experiences in the course.

- **Attendance Policy:** Visit the UNT Attendance Policy (<https://policy.unt.edu/policy/06-039>) to learn more.

COVID-19 Impact on Attendance: While attendance is expected as outlined above, it is important for all of us to be mindful of the health and safety of everyone in our community. Please contact me if you are unable to attend class because you are ill, or unable to attend class due to a related issue regarding COVID-19. It is important that you communicate with me prior to being absent so that I can make a decision about accommodating your request to be excused from class and discuss with you about how to mitigate the impact of the absence on your attainment of course learning goals.

If you are experiencing any symptoms of COVID-19 (<https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html>) please seek medical attention from the Student Health and Wellness Center (940-565-2333 or askSHWC@unt.edu) or your health care provider PRIOR to coming to campus. UNT also requires you to contact the UNT COVID Team at COVID@unt.edu for guidance on actions to take due to symptoms, pending or positive test results, or potential exposure.

- **Academic Integrity Standards and Consequences.** According to UNT Policy 06.003, Student Academic Integrity, academic dishonesty occurs when students engage in behaviors including, but not limited to cheating, fabrication, facilitating academic dishonesty, forgery, plagiarism, and sabotage. A finding of academic dishonesty may result in a range of academic penalties or sanctions ranging from admonition to expulsion from the University.

• **ADA Accommodation Statement.** UNT makes reasonable academic accommodation for students with disabilities. Students seeking reasonable accommodation must first register with the Office of Disability Access (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with a reasonable accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request reasonable accommodations at any time, however, ODA notices of reasonable accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of reasonable accommodation for every semester and must meet with each faculty member prior to implementation in each class. Students are strongly encouraged to deliver letters of reasonable accommodation during faculty office hours or by appointment. Faculty members have the authority to ask students to discuss such letters during their designated office hours to protect the privacy of the student. For additional information, refer to the Office of Disability Access website at <https://studentaffairs.unt.edu/office-disability-access>. You may also contact ODA by phone at (940) 565-4323.

• **Emergency Notification & Procedures.** UNT uses a system called Eagle Alert to quickly notify students with critical information in the event of an emergency (i.e., severe weather, campus closing, and health and public safety emergencies like chemical spills, fires, or violence). In the event of a university closure, please refer to Blackboard for contingency plans for covering course materials.

Synchronous (live) sessions in this course will be recorded for students enrolled in this class section to refer to throughout the semester. Class recordings are the intellectual property of the university or instructor and are reserved for use only by students in this class and only for educational purposes. Students may not post or otherwise share the recordings outside the class, or outside the Canvas Learning Management System, in any form. Failing to follow this restriction is a violation of the UNT Code of Student Conduct and could lead to disciplinary action.