

MICROWAVE AND RF ENGINEERING

E&CE 671 - Fall 2024

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Lecture Time and Location: Thursdays-Fridays 11:30–12:50 pm
(Lecture Room: TBD)

	ECE 671
Final Exam	50 % (Open Book)
Assignments	30 %
Project	20 %

Lecture notes will be distributed. The course materials will be covered from the following books:

Text Book:

[1] D. Pozar, Microwave Engineering, John Wiley & Sons,

Reference Books:

[1] K. C. Gupta, Computer-Aided Design of Microwave Circuits, Dedham, Mass.: Artech, 1981.

[2] G. Gonzalez, Microwave Transistor Amplifier: Analysis and Design, 2nd Edition, Prentice Hall, 1997.

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COURSE DESCRIPTION

The RF technology has been employed in wireless communication systems, biomedical sensors, quantum computer and wide range of industrial applications.

The course focuses on the fundamental methods for the analysis and design of microwave/RF passive and active circuits. The essentials of computer-aided design of microwave/RF circuits as well as major aspects of hardware implementations will be covered. Important RF applications for wireless communication systems will be discussed in details. The course will include:

- Transmission line theories and generalized matrix representation of RF circuits
- Analysis of multiport RF networks.
- Introduction to modern microwave planar technologies.
- Lumped and distributed microstrip circuits.
- Analysis of microstrip circuits.
- Microstrip couplers, hybrids and impedance matching networks.
- Microwave resonators and filters
- Design of RF low noise amplifiers (LNA's),
- Design of RF oscillators and mixers.
- Use of existing commercial CAD design tools for RF circuits.
- Hybrid and monolithic RF circuits.

The students will gain experience in using the Keysight Advanced Design System (ADS) software tool, which is the premier electronic design platform for the design of high frequency and high-speed digital physical layer components.