

ECE 4342: Microwave Solid-State Circuits

Credit / Contact hours: 3 / 3

Course coordinator: Changzhi Li

Textbook(s) and/or other required material: D.M. Pozar, Microwave Engineering, 3 rd ed., Wiley 2005

Catalog description: Study of microwave electronics and design at the device and solid-state circuit level. Circuit design issues such as transistor-based amplifier design, noise, linearity, bandwidth considerations, and microwave oscillators. Design topics to be included are diodes, microwave transistors, and other active devices.

Pre-requisite(s) or co-requisites: ECE 3312 and ECE 3342.

Designation: Elective

Course learning outcomes: Upon completion of this course, students should be able to analyze and design a variety of microwave circuits that contain transmission lines, passive multiport devices, and active solid-state devices.

Student outcomes addressed: a, c, e, and k.

Topics covered

Review of transmission line theory, terminated and lossy transmission lines - 4 hours

Microwave network analysis - the scattering matrix - 4 hours

Smith chart - 2 hours

Impedance transformation and matching - 6 hours

Power dividers and directional couplers - 4 hours

Microwave amplifiers - 7 hours

Microwave oscillators - 4 hours

Microwave detectors, mixers, and control circuits - 7 hours

Tests and reviews - 4 hours