

ECE549
Introduction to Radar Systems
Spring 2017

Prerequisites: ECE 341, ECE 342

Course Credits: 3

Instructor: V. Chandrasekar

Textbook: Class notes posted on-line and reserved texts at the library.

Objective:

This will be a Senior/Graduate course for those interested in the areas of Radars, Microwaves, and Remote Sensing. The course will introduce the basic ideas of radar operations, and will cover the basic design principles of various radar systems. There will be a quick introduction given on Antenna theory so that those without this background can take this course. Also, an introduction to some microwave devices such as directional couplers, mixers, circulators, etc. will be given. Basic EM theory (not a comprehensive knowledge), basic antenna concepts are preferred. Consult the instructor regarding the adequacy of your background. This will be in the category of Physical Science courses.

Course Outline:

- I. The Nature of Radars
Introduction; the simple form of radar equation; application of radar
- II. Radar Antennas
Antenna parameters; antenna radiation pattern; parabolic-reflector antennas; scanning antennas; pattern synthesis
- III. The Radar Equation
Range prediction; min. detectable signal; receiver noise; radar cross section of targets
- IV. Pulsed Doppler radars
Pulse repetition frequency; limitations of MTI; noncoherent MTI; pulse Doppler radar
- V. Radars for observing distributed targets/Remote Sensing
- VI. CW and FM-CW Radars
CW radar; frequency-modulated CW radar; airborne Doppler navigation; multiple-frequency CW radar

VII. Tracking Radars

Tracking with radars; sequential lobing; conical scan; monopulse tracking radar; tracking in range

Grading and Exams:

Homework 30%

Projects 10%

Exam 1 30%

Exam 2 30%