Course Code	ECE432 / ECE632
Course Name	Radar Systems
Credits	4
Course Offered to	UG / PG
Course Description	The course aims to introduce the principles of radar systems to senior undergraduate and graduate students. The course will combine system perspectives, radar phenomenology concepts such as radar cross-section and clutter, and popu

Pre-requisites

Pre-requisite (Mandatory)	Pre-requisite (Desirable)
Signals and Systems	Familiarity with MATLAB

*Please insert more rows if required

Post Conditions

CO1	CO2	CO3
Derive radar systems parameters such as bandwidth, carrier frequency, waveform, power etc. for achieving specific radar characteristics.	Process radar signals to estimate range, velocity and angular positions of targets	Explain the functionalities some common radar applications.

Weekly Lecture Plan

Week Number	Lecture Topic	COs Met	Assignment/Labs/Tutorial
Week 1	*Introduction* - What is radar?, Basic parts of a radar, radar range equation, Information available from a radar, Radar frequencies	C01	Reading Assignment, homework
Week 2, 3	*Radar Phenomenology* - Radar cross section (simple and complex shapes), propagation, clutter and noise	C01	Reading Assignment, homework
Week 4, 5	*Types of radar* - Impulse radar, Doppler radar, MTI and Pulse Doppler Radar, Stepped Frequency and FMCW radar	C01	Reading Assignment, homework
Week 6, 7, 8, 9	*Radar signal processing* - Matched filter, Pulse compression, Synthetic aperture radar and inverse synthetic aperture radar, digital beamforming, space time adaptive processing	C02	Reading Assignment, homework
Week 10, 11, 12	*Brief Discussion on Common Radar applications* - military radar, remote sensing radar, airport surveillance radar, weather / meteorological radar, police radar, ground penetration radar, through-wall radar, automobile radar	C03	Reading Assignment, homework

*Please insert more rows if required

Assessment Plan

Type of Evaluation	% Contribution in Grade
Homework	15
Quiz	10
Mid-sem	25
Project	20
End-sem	30

Resource Material

Type	Title
Textbook	High resolution radar, David Werner
Reference	Introduction to Radar Systems, *3rd edition, McGraw Hill,* M. Skolnik
Reference	Radar Cross Section, *SciTech Publishing* , E. F. Knott, J. F Shaeffer and M. T. Tuley