

GOPAL KRISHNA COLLEGE OF ENGINEERING AND TECHNOLOGY

GOURAHARI VIHAR, PO: RANIPUT, JEYPORE – 764 005

LESSON PLAN

Name of the Subject: RADAR ENGINEERING

Name of the Faculty: Subrat Prasad Rath

Semester: 6th Semester

Branch: ETC

Semester From: January to April

No. of Weeks: 15 Weeks

Week	Day	Theory/ Practical Topics	Classes
		UNIT 1-Radar Fundamentals and Types	7
1	1.	Introduction to radar principles	1
	2.	basic radar equation including search and track forms, pulse radar	1
	3.	CW radar, FM-CW radar	1
	4.	radar range and resolution	1
2	5.	accuracy and minimum detectable signal	1
	6.	Doppler frequency fundamentals	1
	7.	an overview of radar classifications and applications.	1
		UNIT 2-Radar Transmitters, Receivers and Displays	7
3	8.	Radar transmitters including oscillators, power amplifiers and modulator block diagrams	1
	9.	radar receivers such as the superheterodyne receiver, noise figure	1
	10.	low-noise front ends, mixers and IF processing	1
	11.	duplexers including branch type and balanced type	1
4	12.	radar display systems including A-scope	1
	13.	B-scope and PPI	1
	14.	introduction to radar antennas such as reflector antennas and basic phased array concepts	1
		UNIT 3-MTI Radar, Pulse Doppler Radar and Clutter	8
5	15.	MTI radar principles including delay line cancellers	1
	16.	MTI receivers and non-coherent MTI operation	1
	17.	pulse Doppler radar principles	1
	18.	Doppler frequency measurement	1
6	19.	radar cross section and factors affecting RCS	1
	20.	characteristics of clutter	1
	21.	statistical models for noise and clutter	1
		UNIT 4-Radar Signal Processing and Detection	3
6	22.	techniques for clutter reduction	1
	23.	Radar waveforms and pulse compression techniques	1

7	24.	matched filtering concepts, radar detection principles including thresholding	1
	25.	target classification, basic radar tracking concepts.	1
		UNIT 5-Navigation Aids and Emerging Radar Technologies	5
	26.	Navigation systems including loop antennas, radio compass systems	1
	27.	hyperbolic navigation systems such as LORAN-A	1
8	28.	Instrument Landing System (ILS) including localizer, glide slope and marker beacons	1
	29.	an overview of emerging radar technologies such as weather radar	1
	30.	automotive radar and modern phased-array-based radars.	1
	31.		1

Books Recommended:

1. Merri I I. Skolnik: Introduction to Radar Systems,3/e, Tata McGraw Hill.
2. N.S.Nagaraja: Elements of Electronic Navigation, 2/e, Tata McGraw Hill
3. Hamish Meikle, Modern Radar Systems, 2nd Edition, ARTECH House, Inc, , 2014
4. Francois Le Chevalier, Principles of Radar and Sonar Signal Processing, Artech House , 2002