

Bhoj Reddy Engineering College for Women: Hyderabad
Department of Electronics and Communication Engineering
Lesson plan of faculty member for the academic year 2018–19

Class: IV B Tech

Branch-Section: ECE-C

Semester: II

Subject: Radar Systems

Lectures per week: 4

Lecture Number	Topic to be covered	Date(s)
UNIT-1: Basics of Radar and Radar Equation		
1.	Introduction Maximum unambiguous range	27 December 2018
2.	Radar Wave forms, Simple form of Radar Equation	28 December 2018
3.	Radar Block diagram and operation	28 December 2018
4.	Problems related to Radar Equation	29 December 2018
5.	Radar Block diagram and operation	3 January 2019
6.	Radar frequencies and Applications	4 January 2019
7.	Prediction of Range Performance, Minimum detectable signal, Receiver noise	4 January 2019
8.	Problems related to Radar Equation	5 January 2019
9.	Signal to noise ratio, Envelope detector-False Alarm Time and Probability	10 January 2019
10.	Integration of Radar pulses	11 January 2019
11.	Radar cross section of targets (simple targets)	11 January 2019
12.	Transmitter power, PRF and Range ambiguities	12 January 2019
13.	System losses	17 January 2019
14.	Problems related to Radar Equation	18 January 2019
UNIT-2: CW and Frequency Modulated Radar		
15.	CW Radar, Doppler effect, CW Radar block diagram, Isolation between Transmitter and Receiver	18 January 2019
16.	Non-zero IF Receiver, Applications of CW Radar	19 January 2019
17.	Receiver Bandwidth requirements	24 January 2019
18.	Receiver Bandwidth requirements	25 January 2019
19.	Problems related to Transmitter and Receiver	25 January 2019
20.	FM-CW Radar: FM-CW Radar Block diagram, Range and Doppler measurements	31 January 2019
21.	Block diagram operation and Characteristics(approaching and receding targets)	01 February 2019
22.	FM-CW altimeter, Measurement errors, Multiple frequency CW Radar	01 February 2019
23.	Problems related to Range	02 February 2019
UNIT-3 MTI and Pulse Doppler Radar		
24.	MTI and Pulse Doppler Radar, Introduction and principle of operation of MTI Radar with power amplifier transmitter	07 February 2019
25.	MTI Radar with power oscillator transmitter	08 February 2019
26.	Problems related to Doppler effect	
27.	Delay line cancellers and filter characteristics	08 February 2019
28.	Blind speeds, Double cancellation	09 February 2019
29.	Staggered PRF's	14 February 2019
30.	Range gated Doppler filters	15 February 2019
31.	Problems related to Blind speeds	15 February 2019
32.	MTI Radar parameters	16 February 2019
33.	Problems related to Blind speeds	21 February 2019
34.	Limitations to MTI performance MTI versus Pulse Doppler radar	22 February 2019
35.	MTI versus Pulse Doppler radar	22 February 2019

UNIT-4 Tracking Radar		
36.	Tracking with radar	23 February 2019
37.	Problems related to Blind speeds	28 February 2019
38.	Sequential lobing	01 March 2019
39.	Conical scan	02 March 2019
40.	Amplitude comparison monopulse (one and two co-ordinates)	02 March 2019
41.	Problems related to Conical scan	07 March 2019
42.	Phase comparison Monopulse, Target reflection characteristics and angular accuracy	08 March 2019
43.	Tracking in Range	08 March 2019
44.	Problems related to Range	09 March 2019
45.	Acquisition and scanning patterns	14 March 2019
46.	Acquisition and scanning patterns, Comparison of Trackers	15 March 2019
47.	Acquisition and scanning patterns, Comparison of Trackers	15 March 2019
UNIT-5 Detection of Radar Signals in Noise		
48.	Introduction to detection of radar signals in noise	16 March 2019
49.	Matched filter receiver : Response characteristics and derivation	22 March 2019
50.	Correlation function and cross correlation receiver, Efficiency of Non-Matched filters	22 March 2019
51.	Problems related to Range	23 March 2019
52.	Matched filter with Non-White noise, Radar Receivers: Noise figure and Noise Temperature	28 March 2019
53.	Display-Types, Duplexers : Branch type, Balanced type, Circulators as Duplexers	29 March 2019
54.	Phased array antenna Basic concepts	29 March 2019
55.	Problems related to Matched filters	30 March 2019
56.	Radiation pattern	04 April 2019
57.	Beam steering and beam width changes	11 April 2019
58.	Series Versus Parallel feeds	12 April 2019
59.	Applications, advantages and limitations	12 April 2019
60.	Problems related to Noise figure, Noise Temperature	13 April 2019
61.	Revision	18 April 2019
62.	Revision	20 April 2019

Text books:

1. Introduction to Radar Systems-Merill I.Skolnik, TMH Special Indian Edition, 2nd Ed., 2007

Reference books:

1. Radar: Principles, Technology, Applications-Byron Edde, Pearson Education, 2004.
2. Radar Principles-Peebles, Jr., P.Z., Wiley, New York, 1998.
3. Principles of Modern Radar: Basic Principles –Mark A. Richards, James A. Scheer, Williams A. Holm, Yesdee, 2013.

Name and signature of the faculty: Stella Mary J -----

Name and signature of Head of the Department: Ms Shribala N -----