Bhoj Reddy Engineering College for Women: Hyderabad

Department of Electronics and Communication Engineering

Lesson plan of faculty member for the academic year 2020–21

Class: IV B Tech Branch-Section: ECE-B Semester: I

Subject: Radar Systems Lectures per week: 3

Lecture Number	Topics to be covered	Date (s)
UNIT – I: Basics of Radar and Radar Equation		
1	Introduction to Radar , Maximum unambiguous range	2 September 2020
2	Simple form of Radar Equation, Radar Block diagram and operation	4 September 2020
3	Problems related to Radar range equation, Radar frequencies and Applications	7 September 2020
4	Prediction of Range Performance, Minimum detectable signal, Receiver Noise	9 September 2020
5	Signal to noise ratio, Envelope detector-False Alarm Time and False Alarm Probability	11 September 2020
6	Integration of Radar pulses and Radar cross section of targets (simple targets)	14 September 2020
7	Transmitter power, PRF and Range ambiguities, System losses	16 September 2020
8	Problems related to Transmitter power, PRF and Range ambiguities	18 September 2020
UNIT-II: **CW and Frequency Modulated Radar**		
9	CW Radar, Doppler effect, CW Radar block diagram, Isolation between Transmitter and Receiver	21 September 2020
10	Non-zero IF Receiver, Applications of CW Radar, Receiver Bandwidth requirements and problems	23 September 2020
11	FM-CW Radar: FM-CW Radar Block diagram, Range and Doppler measurements	25 September 2020
12	Block diagram operation and Characteristics (approaching and receding targets)	28 September 2020
13	FM-CW altimeter, Measurement errors, Multiple frequency CW Radar and problems	30 September 2020
UNIT-III MTI and Pulse Doppler Radar		
14	Introduction of MTI and Pulse Doppler Radar, Principle of operation of MTI Radar	5 October 2020
15	Power Amplifier Transmitter and Power Oscillator Transmitter	7 October 2020
16	Problems related to Doppler effect	9 October 2020
17	Delay line cancellers and filter characteristics	12 October 2020
18	Blind speeds, Double cancellation,	14 October 2020
19	Staggered PRF's, Range gated Doppler filters	16 October 2020
20	Problems related to blind speeds	26 October 2020
21	MTI Radar parameters, Limitations to MTI radar performance	28 October 2020
22	MTI versus Pulse Doppler radar, Problems related to MTI radar	9 November 2020
UNIT-IV: **Tracking Radar**		
23	Tracking with radar, Sequential lobing, Conical scan	11 November 2020
24	Amplitude comparison monopulse (one and two co-ordinates)	13 November 2020
25	Problems related to amplitude comparison monopulse radar	16 November 2020
26	Phase comparison Monopulse, Target reflection characteristics and angular accuracy	18 November 2020
27	Target reflection characteristics and angular accuracy	20 November 2020
28	Tracking in Range	23 November 2020
29	Problems related to phase comparison tracking radar	25 November 2020
30	Acquisition and scanning patterns	27 November 2020
31	Acquisition and scanning patterns, Comparison of Trackers	2 December 2020

UNIT-V: **Detection of Radar Signals in Noise**		
32	Introduction to detection of radar signals in noise	4 December 2020
33	Matched filter receiver , response characteristics and derivation	7 December 2020
34	Correlation function and cross correlation receiver, Efficiency of Non-Matched filters	9 December 2020
35	Matched filter with Non-White noise, Radar Receivers: Noise figure and Noise Temperature	11 December 2020
36	Duplexers : Branch type, Balanced type, Circulators as Duplexers	14 December 2020
37	Phased array antenna Basic concepts and problems related to receivers	16 December 2020
38	Radiation pattern, Beam steering and beam width changes	18 December 2020
39	Series Versus Parallel feeds, Applications, advantages and limitations	21 December 2020
40	Revision	23 December 2020
41	Revision	28 December 2020
42	Revision	30 December 2020

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, William A. Holm, Yesdee, 2013
4. Radar Handbook - Merrill I. Skolnik, 3rd Ed., McGrawHill Education, 2008.

Name and signature of the faculty : M Swapna ----

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