

CO3	M	M	L	-	-	-	-	-	-	-	-	-	-	-
CO4	M	M	M	-	-	-	-	L	H	M	L	-	-	-
CO5	M	M	M	H	M	-	L	-	-	-	-	L	-	-

g) Course Content

UNIT I BASIC CONCEPTS AND RADAR EQUATIONS 9

Introduction to radar, Radar equation, Radar Block diagram and Operation, Radar Frequencies-millimeter and sub millimeterwaves , Application of Radars, Range performance of radars, System losses and propagation effects.

UNIT II CW, FM CW AND MTI RADAR 9

Introduction to MTI and Doppler radar : Delay Line canceller - Moving Target Detector- Pulse Doppler Radar-CW Radar – FMCW Radar- Multiple or staggered Pulse Repetition Frequencies, MTI radar Processor, Types of MTI.

UNIT III TRACKING RADAR 9

Tracking Radar and its types- Conical scan and Sequential lobbing ,Monopulse Tracking ,Tracking in range ,Automatic tracking with surveillance Radar(ADT).

UNIT IV RADAR CLUTTER AND BASIC NAVIGATIONAL RADAR SYSTEM 9

Introduction to Radar Clutter - Types, Surface clutter radar equation, Four Methods of navigation, Radio direction Finding, Types of Radar Antennas, Automatic directional finders, VHF Omni directional Range (VOR).

UNIT V ADVANCED NAVIGATIONAL SYSTEM 9

Hyperbolic system of Navigation , LORAN (Long Range Navigation) , Decca navigation system, DME (Distance Measurement Equipment) , TACAN (Tactical Air Navigation), Omega Navigation system, Navstar Global positioning system.

Total 45 Hrs

h) Learning Resources

Text Books

1. Skolnik, M., "Introduction to Radar Systems", Tata McGraw-Hill, Third Edition, 2001
2. G S N Raju ,”Radar Engineering and Fundamentals of Navigational Aids” IK International Publishers, 2008
3. N.S.Nagaraja, "Elements of Electronic Navigation Systems", Tata McGraw-Hill, Second Edition, 2000

Reference Books

1. Peyton Z. Peebles, "Radar Principles", John Wiley, 2004.
2. J.C Toomay, " Principles of Radar", 2nd Edition –PHI, 2004.
3. NadowLevanon: "Radar Principals" John Wiley and Sons, 1989.
4. Brookener, "Radar Technology", ArtechHons, 1986.
5. Sen, A.K. & Bhattacharya, A.B. "Radar System and Radar Aids to Navigation", Khanna Publishers, 1988.
6. Slater, J.M. Donnel, C.F.O and others, "Inertial Navigation Analysis and Design", McGraw-Hill Book Company, New York, 1964.

Online Resources

1. www.Nptel.ac.in
2. <https://ocw.mit.edu/resources/res-ll-001-introduction-to-radar-systems>
3. www.radartutorial.eu/index.en.html
4. <https://pe.gatech.edu/courses/basic-radar-concepts>
5. <http://www.geo.uzh.ch/microsite/rsldocuments/research/SARlab/GMTILiterature/PDF/Skolnik90.pdf>