

MICROWAVE AND RADAR COMMUNICATION

Unit I: INTRODUCTION TO MICROWAVES

Introduction – maxwell's equation-ampere's Law Faradays Law - Gauss law-Wave equation-TE –TM wave equation-Wave guides-Rectangular wave guides-propagation of waves in rectangular wave guides-TE-and TM modes - Propagation of TM waves in rectangular wave guides-TM modes in rectangular wave guides.

Unit II: MICROWAVE AMPLIFIERS AND OSCILLATORS

Klystrons-Two cavity Klystron - Multicavity Klystron-Reflex klystron-Power output and frequency characteristics - Efficiency of reflex Klystron – Travelling wave tube (TWT)-Application of TWT - Backward wave oscillator -Magnetron- Cavity Magnetron-sustained oscillation in Magnetron-characteristics and applications of magnetron.

Unit III: MICROWAVE ANTENNAS

Quantitative theory of short dipole antenna- characteristics of grounded quarter wave and ungrounded half wave antenna-radiation resistance and radiation pattern –folded dipole and its application-broad side and end fire array -loop antenna-direction finding by Adcock and beeline tossi system-helical rhombic -Yagi antenna-horn antenna and parabolic reflectors.

Unit IV : PRINCIPLES OF RADAR

Introduction-Block diagram of RADAR – Applications of RADAR – Range equation-minimum detectable signal-Receiver Noise-S/N Ratio – transmitter power –maximum ambiguous range –system losses. Receiver: Duplexer-Local Oscillator-Mixer - Line pulse modulator - Displays- PPI.

Unit V: FM RADAR AND MTI

Doppler effect -CW radar-FM CW radar - Multiple frequency CW radar moving target indicator (MTI) - Non coherent MTI - Pulsed Doppler Radar FM altimeter-Tracking –Sequential lobbing – Conical Scan – Monopulse tracking radar.

TEXT BOOK

1. Microwave and Radar Engineering – N.Kulkarni, Umesh Publication
2. Radar and Navigation-Scholnik- McGraw Hill International edition.
3. Antenna and Propagation- K.D. Prasad-Sathya Prakash Publications.