PET6I102 HIGH FREQUENCY ENGINEERING (3-0-2)

MODULE-I (10 HOURS)

Microwave Tubes- Limitations of conventional tubes, construction, operation; Properties of Klystron Amplifier, reflex Klystron, Magnetron, Travelling Wave Tube (TWT); Backward Wave Oscillator (BWO); Crossed field amplifiers.

MODULE-II (10 HOURS)

Microwave Solid State Devices- Limitation of conventional solid state devices at Microwaves; Transistors (Bipolar, FET); Diodes (Tunnel, Varactor, PIN), Transferred Electron Devices (Gunn diode); Avalanche transit time effect (IMPATT, TRAPATT, SBD); Microwave Amplification by Stimulated Emission of Radiation (MASER).

MODULE-III (10 HOURS)

Microwave Components- Analysis of Microwave components using s-parameters, Junctions (E, H, Hybrid), Directional coupler; Bends and Corners; Microwave posts, S.S. tuners, Attenuators, Phase shifter, Ferrite devices (Isolator, Circulator, Gyrator); Cavity resonator.

MODULE-IV (12 HOURS)

Introduction to Radar Systems- Basic Principle-Block diagram and operation of Radar; Radar range Equation; Pulse Repetition Frequency (PRF) and Range Ambiguities.
Doppler Radars- Doppler determination of velocity, Continuous Wave (CW) radar and its limitations, Frequency Modulated Continuous Wave (FMCW) radar, Basic principle and operation of Moving Target Indicator (MTI) radar, Delay line cancellers, Blind speeds and staggered PRFs.
Scanning and Tracking Techniques- Various scanning techniques (Horizontal, vertical, spiral, palmer, raster, nodding); Angle tracking systems (Lobe switching, conical scan, mono pulse),

ADDITIONAL MODULE (TERMINAL EXAMINATION-INTERNAL)

Microwave Measurements- Power measurements using calorimeters and bolometer; Measurement of Standing Wave Ratio (SWR), Frequency and wavelength; Microwave bridges; Matched termination.
Applications of Radar; Range tracking systems, Doppler (velocity) tracking systems.

TEXT BOOKS

1. Microwave Engineering, David M. Pozer, Fourth Edition, Wiley Publications, 2011
2. Microwave Engineering, Sushrut Das, Oxford University Press, 2014.
3. Introduction to radar systems, Merill I. Skolink, McGraw Hill Publications, Second Edition, 2001
4. Microwave and Radar Engineering, G. S. Rao, Pearson India Publisher, 2014

REFERENCE BOOKS

1. Microwave devices and Circuits, Samuel Liao, Pearson Education Publisher, Third Edition,1990
2. Foundation of Microwave Engg, R.E. Collin, Second Edition,Wiley Publications, 2007
3. Microwave devices and Radar Engg, M. Kulkarni; Umesh Publications, Fifth Edition,1998
4. Microwave Engineering, Subol Kar, University Press.