

PPH438 MICROWAVE THEORY AND TECHNIQUES

L T P Cr
3 1 0 3.5

Course Objectives: To build up the concept from basics of microwave communications to modern applications

Microwave Transmission. Basics, Concept of Mode: TEM, TE and TM Modes and their characteristic, Losses and concept and microwave impedance.

Microwave Transmission Lines. Coaxial Line, Rectangular Waveguide, Circular waveguide, Stripline and Microstrip Line.

Microwave Network Analysis and Measurements: Equivalent Voltages and currents for non-TEM lines, Network parameters and Scattering Parameters for microwave Circuits. Power, Frequency and impedance measurement, Network Analyser and measurement of scattering parameters.

Microwave Devices. Active component: Diodes, transistors, oscillators and mixers. Passive component: Directional coupler, Power divider, Magic tree, attenuator and resonator. Low power microwave devices: Gun diodes. High power microwave devices: Travelling wave tubes (TWT), Magnetron and klystron.

Microwave Systems and applications: Radar, Cellular Phone., Satellite Communication, Electromagnetic interference / Electromagnetic Compatibility (EMI / EMC) as modern application.

Course learning outcomes: Students will have achieved the ability to:

1. describe microwave transmission modes and transmission lines.
2. analyze microwave networks and measure their measurements parameters.
3. explain the working of various microwave devices
4. Identify the modern day applications of microwaves.

Recommended Books:

1. David, M. Pozar, *Microwave Engineering*, Wiley India, (2012).
2. Ramo, S., Whinnery, J.R., and Duzer, T.V., *Fields and Waves in Communication Electronics*, Wiley India.
3. Collin, R.E., *Foundations for Microwave Engineering*, IEEE Press.

Evaluation Scheme:

Sr. No.	Evaluation Elements	Weightage (%)
1	MST	30
2	EST	45
3	Sessionals (May include assignments/quizzes)	25