

Module No.	Unit No.	Topics	Hrs.
<b>1.0</b>		<b>Introduction to Microwaves</b>	<b>08</b>
	<b>1.1</b>	Microwave Frequency Bands in Radio Spectrum, Characteristics, Advantages and Applications of Microwaves.	
	<b>1.2</b>	Scattering parameters: Characteristics and Properties.	
	<b>1.3</b>	Strip lines, Microstrip lines and coupled lines: Analysis and design.	
	<b>1.4</b>	Design of Impedance matching network using lumped and distributed parameters.	
<b>2.0</b>		<b>Waveguides and Passive Devices</b>	<b>08</b>
	<b>2.1</b>	Rectangular and circular waveguides: Construction, Working and Mode analysis.	
	<b>2.2</b>	Resonators, Re-entrant cavities, Tees, Hybrid ring, Directional couplers, Phase shifters, Terminations, Attenuators and Ferrite devices such as Isolators, Gyrotors, and Circulators.	
<b>3.0</b>		<b>Microwave Tubes</b>	<b>10</b>
	<b>3.1</b>	Two Cavity Klystron, Multi-Cavity Klystron and Reflex Klystron.	
	<b>3.2</b>	Helix Travelling Wave Tube and Cross Field Amplifier.	
	<b>3.3</b>	Backward Wave Oscillator, Cylindrical Magnetron and Gyrotron.	
<b>4.0</b>		<b>Microwave Semiconductor Devices</b>	<b>10</b>
	<b>4.1</b>	Diodes: Varactor, PIN, Tunnel, Point Contact, Schottky Barrier, Gunn, IMPATT, TRAPATT, and BARITT.	
	<b>4.2</b>	Transistors: BJT, Hetro junction BJT, MESFET, and HEMT	
	<b>4.3</b>	Parametric Amplifiers and Applications.	
<b>5.0</b>		<b>Microwave Measurements</b>	<b>06</b>
	<b>5.1</b>	VSWR, Frequency, Power, Noise, $Q$ -Factor, Impedance, Attenuation, Dielectric Constant, Antenna Gain.	
<b>6.0</b>		<b>Microwave Integrated Circuits (MIC)</b>	<b>06</b>
	<b>6.1</b>	MIC Materials.	
	<b>6.2</b>	Types of MIC: Hybrid and Monolithic MIC.	
	<b>6.3</b>	Chip Mathematics.	
		<b>Total</b>	<b>48</b>