

LESSON PLAN SESSION JUL – DEC 2024

SUBJECT: **Antenna & Microwave**

SEMESTER: **5th**

BRANCH: - **Electronics and Telecommunication Engineering**

UNIT NUMBER	NAME OF THE TOPIC	NO OF CLASS REQUIRED	TOTAL CLASSES	REMARK
Unit-1.0 Wave Propagation	1.1 Elementary concepts of propagation of Electromagnetic (EM) waves, properties of EM waves Classification of EM waves bands, guided and unguided wave propagation.	02	10	
	1.2 Propagation of ground wave, space wave and sky wave.	03		
	1.3 Ionospheric layers: D, E and F layer, Skip distance, Critical frequency, Plasma frequency, Maximum Usable Frequency(MUF), Actual and Virtual height of the ionospheric layer, Multi hops and Duct propagation.	03		
	<ul style="list-style-type: none"> • Concepts beyond class 	01		
	<ul style="list-style-type: none"> • QUIZ. • Doubt clearing session 	01		ASSIGNMENT -1
Unit 2.0 Antenna Fundamentals	2.1 Basic definition of antenna and working principle, point source, dipole antenna, Isotropic radiator.	01	10	
	2.2 Antenna parameters: impedance, radiation resistance, radiation pattern, beam width and beam efficiency, gain, directivity and, radiation intensity, half power BW(HPBW), polarization, antenna losses, antenna efficiency, effective aperture, effective length of antenna	02		
	2.3 Effects of antenna height on the signal reception.	01		
	2.4 Working Principal, radiation pattern and application of following antennas: Half wave dipole, Loop and Helical antenna, Horn, Yagi-uda, folded dipole and Rhombic Antenna, Parabola reflector antenna and Log periodic antenna	03		
	2.5 Fundamental of Antenna arrays: Broadside and end fire array, working, radiation pattern and applications.	01		
	<ul style="list-style-type: none"> • Concepts beyond class 	01		
	<ul style="list-style-type: none"> • QUIZ 	01		ASSIGNMENT-2

	<ul style="list-style-type: none"> Doubt clearing session 			
Unit 3.0 Transmission Lines and Waveguides	3.1 Introduction : transmission line, equivalent circuit of transmission line, voltage and current relationship, propagation constants, attenuation constant, characteristic impedance, Reflection coefficient, Standing wave and VSWR, Short circuit and open circuit line, Half wave, quarter wave, eight wave line and their uses, Impedance matching, Co- axial cable.	03	10	
	3.2 Wave guide: Working principle, types of waveguides: Rectangular, Circular Wave Guide, Modes of propagation (basic idea only), function, characteristics and applications.	02		
	3.3 Microwave components : E plane, H-plane, Magic Tee Directional Coupler, Attenuator, Isolator Circulator, joints, bands, phase shifters(Basic idea only)	03		
	<ul style="list-style-type: none"> Concepts beyond class 	01		
	<ul style="list-style-type: none"> QUIZ Doubt clearing session 	01		ASSIGNMENT-3
Unit 4.0 Microwave Amplifiers and Measurement	4.1 Limitations of microwavetube at microwave frequency	01	10	
	4.2 Microwave linear beamtube (O Type)	01		
	4.3 Microwave tubes amplifiers: Klystron - Two cavity and multi cavity, Travelling Wave Tube(TWT)construction, working and applications	03		
	4.4 Microwave tubes oscillators: Reflex klystron, Magnetron, Backward Wave Oscillator construction, working and applications	02		
	4.5 Microwave cross field tube(M Type):Magnetronoscillator construction, working and applications	01		
	<ul style="list-style-type: none"> Concepts beyond class 	01		
	<ul style="list-style-type: none"> QUIZ Doubt clearing session 	01		ASSIGNMENTS PROVIDED AND EVALUATED
Unit 5.0 Microwave Solid State Devices	5.1 Limitation of transistors at microwave frequencies, Tunnel diode	01	08	
	5.2 Gunn diode (working and	01		

	construction only)			
	5.3 Transferred electron device: Transit time device, IMPATT & TRAPATT(basic idea only)	02		
	5.4 PIN diode and their applications	02		
	• Concepts beyond class	01		
	• QUIZ • Doubt clearing session	01		ASSIGNMENTS PROVIDED AND EVALUATED
Total Classes Required		48	48	

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