

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN
Department of Electronics & Communication Engineering
Lecture Plan

III Year B.Tech – ECE - II Semester

Subject: Microwave Engineering

Faculty: Prof.V.SUBRAHMANYAM

Classes Commence from 20th Nov 2017.

Days	UNIT NUMBER	Topics	No. Of Hours required
1	UNIT-I: Microwave Transmission Lines No Of Hours Required 10	Introduction Microwave Spectrum & Bands Applications of Microwaves.	02
2		RECTANGULAR WAVEGUIDES TE/TM Mode Analysis, Expressions for Fields,	02
3		Characteristic Equation and Cut off Frequencies, Filter Characteristics Dominant and Degenerate modes. Sketches of TE and TM mode fields in cross section. Mode Characteristics.	02
4		Phase and Group Velocities. Wavelengths and Impedance Relations. Power Transmission and Power Losses in Rectangular Waveguides.	02
5		Impossibility of TEM Mode in Waveguides. Related Problems.	02

Days	UNIT NUMBER	Topics	No. Of Hours required
6	UNIT-II: Circular Waveguides No of Hours Required 08	Introduction, Nature of Fields. Characteristic Equation Dominant and Degenerate Modes.	02
7		Micro strip Lines. Zo Relations Effective Dielectric Constant, Losses, Q factor.	02
8		Cavity Resonators. Rectangular and Cylindrical Cavities. Dominant modes and Resonant Frequencies. Q factor, Coupling Coefficients.	02
9		Exciting Techniques. Waveguides and Cavities. Related Problems.	02

Days	UNIT NUMBER	Topics	No. Of Hours required
10	UNIT – III Waveguide Components And Applications No of hours required 14	Coupling Mechanism; Probe, Loop and Apertures.	02
		Waveguide Discontinuities: Irises, Screws and Posts.	
11		Matched Loads.	
		Waveguide Attenuators: Resistive Card and Rotary Vane.	02
		Waveguide Phase Shifters: Dielectric and Rotary Vane.	
12		Scattering Matrix, Significance, Formulation and Properties	02
13		S matrix calculations for E, H and E-H Plane Tees and Hybrid Ring	02
14		Directional Couplers: Two Hole Type & Bethe Hole Type	02
15	Ferrite Components-Functioning of Gyrator, Isolator and Circulator	02	
16	S matrix Calculations for Gyrator, Isolator and Circulator Related Problems.	02	

As per academic calendar, the above three units are to be covered in eight weeks @ four periods a week. i.e., Total Hours are 32. Required Hours for I Mid are 32. First Mid Examinations commences from 15th Jan 2018.

2nd Unit of instructions commence from 22nd Jan 2018 for eight weeks till 17th March 2018.

Days	UNIT NUMBER	Topics	No. Of Hours required
6	UNIT-IV: Microwave Tubes No of hours required 10	Introduction. Limitations and Losses of Conventional Tubes at Microwave Frequencies. Microwave Tubes-Classification	02
7		O Type Tubes. Two cavity Klystron Structure-Reentrant Cavities-Velocity Modulation-Applegate Diagram-Bunching Process	02
8		Small Signal Theory-Expressions for Output power and Efficiency.	02
9		Reflex Klystron-Structure-Applegate Diagram-Principle of Working-Mathematical theory of Bunching.	02
10		Power Output and Efficiency-Electronic Admittance-Oscillating Modes-Output Characteristics-Electronic and Mechanical Tuning. Related Problems	02

Days	UNIT NUMBER	Topics	No. Of Hours required
6	UNIT-V: Helix TWTS & M-type Tubes Number Of Hours Required 10	Significance, Types and Characteristics of Slow wave Structures; Structure of TWT and Amplification Process.	02
7		Suppression of Oscillations. Nature of Four Propagation Constants.	02
8		M Type Tubes. Introduction. Cross-Field Effects. Magnetrons-Different Types.	02
9		8 Cavity Cylindrical Travelling wave Magnetron. Hull Cut-Off and Harte Conditions.	02
10		Modes of resonance and PI Mode Operation. Separation of PI mode. Output Characteristics.	02

Days	UNIT NUMBER	Topics	No. Of Hours required
11	UNIT-VI: Microwave Solid State Devices & Microwave Measurements No Of Hours Required 12	Microwave Solid State Devices- Introduction , Classification and Applications. TEDs & Introduction.	02
12		Gunn Diode-Principle. RWH theory Characteristics	02
13		Basic modes of operation. Oscillation modes.	02
14		Avalanche Transit Time Devices. Introduction, IMPATT and TRAPATT Diodes-Principle of Operation and Characteristics..	02
15		Microwave Measurements. Description of Microwave Bench-Different Blocks and their features-Precautions.	02
16		Microwave Power Measurement-Bolometer Method. Measurement of Attenuation, Frequency, VSWR, Cavity Q and Impedance.	02

The above three units are to be covered in 32 hours in the eight week period @ four periods a week. Total number of hours required for II Mid are 32.

TOTAL NO. OF HOURS REQUIRED FOR THE SEMESTER : 64.

II Mid Examinations are conducted from 19th March 2018 till 24th March 2018.

The Semester End Examinations will be from 2nd April 2018 to 14th April 2018.

Text Books: 1. Microwave Devices and Circuits Samuel Y Liao
 2. Microwave Engineering-Passive Circuits Peter A Rizzi
 3. Microwave and Radar Engineering M.Kulkarni

B.Tech IV year First Semester commences from 11th June 2018.