

GOVERNMENT POLYTECHNIC, PUNE
(An Autonomous Institute of Govt. of Maharashtra)

Programme	:	Diploma in ET/CE/EE//ME/MT/CM/IT/DDGM
Programme Code	:	01/02/03/04/05/06/07/08/16/17/21/22/23/24/26
Name of Course	:	Microwave Communication
Course Code	:	ET 483

Teaching Scheme:

	Hours /Week	Total Hours
Theory	03	48
Practical	02	32

Evaluation Scheme:

	Progressive Assessment	Semester End Examination			
		Theory	Practical	Oral	Term work
Duration	Two class tests, each of 60 minutes	3 Hrs.	3 Hrs.	3 Hrs	--
Marks	20	80	--	25	--

Course Rationale:

This subject is introduced with view that the students are made familiar with microwave devices & to gain knowledge of Microwave Communication Systems.

Course Objectives:

After studying this course, the student will be able to

- To Understand working of microwave components & devices.
- To Understand working of microwave amplifier.
- To Understand working of microwave tubes.
- To Understand working Principle of radar.

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Course Content:

Chapter No	Name of Topic/Sub topic	Hrs	Marks
1.	Introduction to Microwave		
	1.1 Electromagnetic Wave Spectrum 1.2 Introduction to Microwave and its Applications 1.3 Microwave region and Band designation	02	04
2.	Wave Guides		
	2.1 Introduction to TEM/TE/TM/HE wave destination. 2.2 Comparison of wave guide with two wire transmission line. 2.3 Propagation of waves in rectangular wave guide and circular wave guide. (Introduction to wave guide only) 2.4 TE & TM Modes in rectangle wave guide with field pattern. Concept of dominant mode. 2.5 Definition and interpretation of cut off frequency of a waveguide, guide wave length, phase velocity, group velocity(Simple Numerical) 2.6 Cavity Resonators	08	14
3.	Microwave Components		
	3.1 Construction, Working principle & application of H-plane Tee, E-Plane Tee, E-H Plane TEE, wave guide Twists, wave guide bends and corners, 3.2 Fixed and variable attenuator, detector mount, matched termination 3.3 Multihole directional coupler, circulator, Isolator. 3.4 Mixer, switches and its types 3.5 Waveguide coupling & its types: slot, rotating.	08	14
4.	Microwave Tubes		
	construction & working principle of : 4.1 Microwave triodes and UHF triodes. 4.2 Multicavity Klystron Amplifier 4.3 Reflex Klystron. 4.4 TWT. 4.5 Magnetron.	10	16
5.	Semiconductor Microwave Devices & Circuits		
	5.1 Transistors & ICs. 5.2 Varactor & step recovery diodes. 5.3 Frequency multipliers. 5.4 Tunnel diodes.	10	16

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	5.5 Negative resistance amplifiers. 5.6 Gunn effect & Diodes. 5.7 PIN Diodes.		
6.	Radar Theory	10	16
	6.1 Fundamentals: Basic concept of Radar, Block diagram of an elementary pulsed Radar, Duplexer concept. 6.2 Concept of continuous Wave Radar, Doppler effect & Speed Measurement. 6.3 Block diagram and explain the operation of MTI radar 6.4 Application of Radar		
	TOTAL	48	80

List of Practical/Experiments/Assignments:

Sr. No.	Name of Experiment/Assignment
1.	Measurement of Guide wavelength & free space wavelength.
2.	Measurement of voltage standing wave ratio (V.S.W.R.) & reflection coefficient.
3.	Study of attenuators, TEEs, matched termination
4.	Study of cross directional coupler, isolator and circulator.
5.	Characteristics of Gunn Oscillator.
6.	Measurement of Microwave frequency.
7.	To plot V-I characteristics of varactor diode.
8.	To plot V-I characteristics of Gunn diode.
9.	To plot V-I characteristics of tunnel diode.
10.	To plot V-I characteristics of PIN diode.

Instructional Strategy:

Sr. No.	Topic	Instructional Strategy
1.	Introduction to Microwave	Class room teaching & Laboratory work
2.	Wave Guides	Class room teaching & Laboratory work
3.	Microwave Components	Class room teaching & Laboratory work
4.	Microwave Tubes	Class room teaching , Laboratory work , Simulation & Presentation on PC
5.	Semiconductor Microwave Devices & Circuits	Class room teaching & Laboratory work
6.	Radar Theory	Class room teaching , Simulation & Presentation on PC

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Text Books:

Sr. No	Author	Title	Publication
1.	Kennedy	Principle of communication	Mcgraw Hill
2.	Gerd Keiser	Optical communication	

Reference Books:


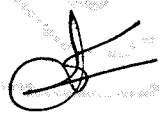
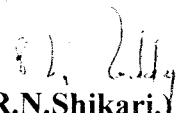
Sr. No	Author	Title	Publication
1.	M. Kulkarni	Microwave and Radar Engg.	
2.	Roddy coolen	Electronics Communication	PHI

Learning Resources: Reference Books, Manuals and Journals of Devices, Components Brochures, Notes, Websites

Specification Table:

Sr. No.	Topic	Cognitive Levels			Total
		Knowledge	Comprehension	Application	
1.	Introduction to Microwave	02	00	02	04
2.	Wave Guides	06	04	04	14
3.	Microwave Components	07	03	04	14
4.	Microwave Tubes	08	04	04	16
5.	Semiconductor Microwave Devices & Circuits	08	03	05	16
6.	Radar Theory	06	04	06	16
Total		37	18	25	80

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