

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

Programme	:	Diploma in ET/CE/EE//ME/MT/CM/IT/DDGM
Programme Code	:	01/02/03/04/05/06/07/08/21/22/23/24/26/16/17
Name of Course	:	Wireless and Mobile communication
Course Code	:	ET 581

Teaching Scheme:

	Hours /Week	Total Hours
Theory	04	64
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.	--
Marks	20	80	--	25	25

Course Rationale:

This subject is introduced with the view that students are made familiar with wireless and mobile communication.

Course Objectives:

After studying this course, the student will be able to

- Understand the concept of wireless communication.
- Understand the concept of wireless local Loop.
- Understand the Cellular mobile communication.
- Understand the Digital Cellular mobile communication.

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Course Content:

SECTION I

Chapter No.	Name of Topic/Sub topic	Hrs	Marks
1.	Wireless Introduction and Standards		
	1.1 Introduction <ul style="list-style-type: none"> • Introduction to wireless Communication Systems • Example of wireless communication 	10	12
	1.2 Wireless communication system generation and standards <ul style="list-style-type: none"> • First Generation and Its standards (AMPS,NAMPS,PDC) • Second generation and its standard (GSM,IS-136,PDC, IS-95), • 2.5 Generation and its standard (HSCSD,GPRS,EDGE,IS-95B) • Third Generation and Its standards (W-CDMA,EDGE,TD-SCDMA,CDMA-2000) 		
	1.3 Local Loop <ul style="list-style-type: none"> • Wireless Local Loop(LMDS) • PAN 		
2.	Radio Propagation		
	2.1 Three basic propagation mechanisms: (Definitions and mathematical equations) <ul style="list-style-type: none"> • Reflection: Reflection from dielectrics, Perfect Conductor • Diffraction: Fresnel Zone geometry, Knife-edge model • Scattering 	12	14
	2.2 Free space propagation model(mathematical equation)		
	2.2 Practical link budget design using path loss models (mathematical equations) <ul style="list-style-type: none"> • Log distance path loss model • Log Normal shadowing 		
	2.4 Multipath propagation <ul style="list-style-type: none"> • Small scale multipath Propagation(Factors, Doppler shift) • Types of Small Scale fading (based on time delay spread and Doppler spread) • Large scale path loss 		
3.	Multiple access techniques		
	3.1 Introduction to multiple access techniques. <ul style="list-style-type: none"> • FDMA,TDMA • CDMA 	10	14
	<ul style="list-style-type: none"> • Spread Spectrum Multiple access • FHSS (Frequency Hopped Spread Spectrum) • DSSS (Direct Sequence Spread spectrum) 		
	3.2 Wi-Fi and Wi-Max <ul style="list-style-type: none"> • Introduction of wi- fi and its standards(802.11) • Introduction of Wi-Max and Its standards (802.16) 		

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SECTION II

4	Introduction to cellular Mobile system		
	4.1 Mobile system <ul style="list-style-type: none"> • Limitations of conventional Mobile communication system. • History of 800MHZ frequency. • Trucking Efficiency. 	10	14
	5.2 Cellular Mobile communication <ul style="list-style-type: none"> • Definition of Cell, Size and shape of cell • Basic cellular System (Block diagram,MTSO) • Operation of Cellular systems 		
5	Elements of cellular Mobile radio system		
	5.1 Introduction <ul style="list-style-type: none"> • Maximum number of calls per hr per cell. • Maximum number of frequency channels per cell 	12	16
	5.2 Frequency reuse <ul style="list-style-type: none"> • Definition • Frequency reuse schemes • Frequency reuse factor 		
	5.3 Hand off <ul style="list-style-type: none"> • Handoff concept • Hand off types (Hard,soft,delayed and queued hand off) 		
	5.4 Co-channel interference <ul style="list-style-type: none"> • Co-channel interference reduction factor 		
	5.5 Cell splitting <ul style="list-style-type: none"> • Cell splitting Concept • Sectoring • Microcell zone concept 		
6	Digital Cellular Mobile Systems		
	6.1 GSM System <ul style="list-style-type: none"> • GSM Features • GSM system Architecture • Frame structure of GSM system 	10	10
	6.2 IS-95 system <ul style="list-style-type: none"> • IS-95 system architecture. • Frequency and channel Specifications 		
	TOTAL	64	80

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List of Practical/Experiments/Assignments:

Sr. No.	Name of Experiment/Assignment
1.	Study of 2G, 3G Network
2.	To understand the operation of multiple access technique.
3.	To observe and understand the various process of mobile system.
4.	To identify and understand different section and components of GSM Mobile.
5.	To observe and analyze input /output signals of different sections
6.	(Four Experiments)To understand and perform various operations of mobile phone through AT Commands
7.	To understand and perform fault finding and troubleshooting of mobile Phone handset.
8.	Two experiments on Mobile Handset Maintenance.

Instructional Strategy:

Sr. No.	Topic	Instructional Strategy
1.	Wireless communication system	Classroom teaching & Laboratory work
2.	Mobile radio propagation	Classroom teaching
3.	Wi-fi, Wi- Max	Classroom teaching & Visit
4.	Introduction To Cellular Mobile system	Classroom teaching & Industrial Visit
5.	Elements of Cellular Mobile radio system Design	Classroom teaching & Industrial Visit
6.	Digital Cellular Mobile Systems	Classroom teaching & Laboratory work

Text Books:


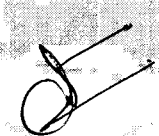

Sr. No	Author	Title	Publication
1	T.S. Rapport	Wireless communication principle & Practice	PHI
2	C.Y.Lee	Mobile Cellular Telecommunication System	TMH

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Specification Table:

Sr. No.	Topic	Cognitive Levels			Total
		Knowledge	Comprehension	Application	
1.	Wireless Communication System	06	02	04	12
2.	Mobile radio propagation	05	05	04	14
3.	Wi-Fi, Wi- Max	04	02	04	14
4.	Introduction to Cellular Mobile system	06	04	04	14
5.	Elements of Cellular Mobile Radio System Design	04	05	05	14
6.	Digital Cellular Mobile Systems	04	04	04	12
Total		24	44	12	80

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