

The Maharaja Sayajirao University of Baroda Polytechnic Diploma in Electronics & Communication Engg. (HPP)			ACADEMIC YEAR 2023-24		
Year	III	CORE / ELECTIVE / FOUNDATION MOBILE COMMUNICATION (ELE3521)	Lecture/Lab Hrs per week	4/2	
Semester	I		Max marks	100	
Pre-Requisite: Analog communications, Digital communication					
CO1	Explain telephone communication fundamentals and mobility issues.				
CO2	Describe wireless communication evolution, system types, 2G/3G networks.				
CO3	Analyze cellular concepts: frequency reuse, channel assignment, interference.				
CO4	Evaluate cellular strategies: handoff, trunking, coverage/capacity, antenna issues..				
CO5	Assess GSM, CDMA, LTE architectures, protocols, handover, security, features.				
BT	1. Remember 2. Understand 3. Application 4. Analysis 5. Evaluation 6. Creation				
COURSE CONTENT/SYLLABUS					
Unit	Unit Name		Hrs.	Weightage	CO
1	BASIC TELEPHONE COMMUNICATION SYSTEM The telephone instruments: Transmitter & Receiver, the telephone loop, Two Wire/Four Wire transmission, Design of Subscriber loop, Design of Load Area Transmitters. Mobility Issue.		6	10	CO1
2	INTRODUCTION TO WIRELESS COMMUNICATION SYSTEM Evolution of mobile communications, Mobile Radio System around the world, Types of Wireless communication System, Comparison of Common wireless system, Trend in Cellular radio and Personal communication. Second generation Cellular Networks, Third Generation (3G) Wireless Networks.		10	20	CO2, CO5
3	FUNDAMENTALS OF CELLULAR SYSTEM Cellular system, Hexagonal geometry cell and concept of frequency reuse, Channel Assignment Strategies, Channel & co-channel interference, S/I ratio consideration and calculation for Minimum Co-channel and adjacent interference.		10	20	CO3, CO4
4	CELLULAR SYSTEM STRATEGIES Handoff Strategies, Umbrella Cell Concept, Trunking and Grade of Service, Improving Coverage & Capacity in Cellular System-cell splitting, Cell sectorization, Repeaters, Micro cell zone concept, Channel antenna system design considerations, Call Establishment Process.		10	20	CO3, CO4
5	GLOBAL SYSTEM FOR MOBILE COMMUNICATION GSM system architecture, Radio interface, Protocols, Localization and calling, Handover, Authentication and security in GSM, GSM speech coding, GPRS system architecture.		6	10	CO5
6	CDMA TECHNIQUES AND LONG TERM EVOLUTION(LTE) Concept of spread spectrum, Architecture of IS-95 CDMA system, Air interface, CDMA forward channels, CDMA reverse channels, CDMA features, Power control in CDMA, Performance of CDMA System, CDMA2000 cellular technology. Concept of WCDMA. LTE architecture.		10	20	CO5

	VOLTE			
		52	100	
REFERENCE BOOKS:				
1.	“Wireless Communication”- Theodore S. Rappaport, Prentice hall			
2.	“Mobile Communications Engineering”, William C. Y. Lee, Mc Graw Hill Publications			
3.	Wireless Communications-T.L.Singh-TMH			
4.	Adhoc Mobile Wireless network, C.K.Toh Pearson			

CO / PO & PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2			2	2	1	2	2
CO2	3	2		2	2	2	2	2	3
CO3	3	3	2	2	2	2	2	3	3
CO4	3	3	3	3	2	3	2	3	3
CO5	3	2	3	2	2	3	2	3	3

CO	PO / PSO	Justification
CO1	PO1	Applies fundamental knowledge of telephone systems and mobility principles.
	PO2	Analyses mobility issues and telephone loop behavior.
	PO5	Considers societal impact of communication infrastructure and service quality.
	PO6	Lab exercises involve basic implementation and teamwork on system setups.
	PO7	Encourages learning about emerging wireless technologies.
	PSO1	Practical understanding of telephone systems and loops.
	PSO2	Use of tools for simulating basic mobile communication setups.
CO2	PO1	Knowledge of evolution and architecture of wireless systems.
	PO2	Comparison and analysis of wireless systems.
	PO4	Use of simulation tools for wireless communication experiments.
	PO5	Awareness of ethical deployment and societal impact of mobile networks.
	PO6	Hands-on lab on wireless setup encourages teamwork.
	PO7	Updates knowledge on evolving wireless standards.
	PSO1	Implementing practical wireless experiments.
CO3	PO1	Core cellular concepts and reuse principles.
	PO2	Analyses interference, frequency assignment, and S/I ratio calculations.
	PO3	Helps in designing basic network frequency plans.
	PO4	Lab simulations of cellular systems.
	PO5	Designing for coverage/capacity with societal impact in mind.
	PO6	Collaborative lab exercises for system planning.
	PO7	Encourages ongoing study of cellular techniques.
CO4	PO1	Practical experiments and simulations of cellular networks.
	PO2	Hands-on use of software tools for network planning.
	PO3	Practical experiments and simulations of cellular networks.
	PO4	Hands-on use of software tools for network planning.
	PO5	Hands-on use of software tools for network planning.
	PO6	Hands-on use of software tools for network planning.
	PO7	Hands-on use of software tools for network planning.
CO5	PO1	Cellular strategies, handoff, and antenna considerations.
	PO2	Analysis of coverage, capacity, and system performance.
	PO3	Designing handoff and trunking strategies.
	PO4	Simulations of network performance metrics.
	PO5	Ensuring coverage and capacity with societal relevance.

CO	PO / PSO	Justification
	PO6	Teamwork in lab-based strategy simulations.
	PO7	Updates on modern cellular strategies.
	PSO1	Lab exercises for coverage analysis.
	PSO2	Use of tools/software for network evaluation.
CO5	PO1	Understanding advanced standards: GSM, CDMA, LTE.
	PO2	Analysis of protocol, handover, and security features.
	PO3	Designing simplified system layouts and planning experiments.
	PO4	Practical simulations of LTE/3G/4G concepts.
	PO5	Awareness of societal and ethical impact of mobile tech.
	PO6	Lab projects involve team-based evaluation and simulation.
	PO7	Lifelong learning in emerging mobile technologies.
	PSO1	Hands-on simulation and testing of mobile communication systems.
	PSO2	Use of software and instruments in labs.