

18ECPE604		WIRELESS COMMUNICATION		L	T	P	C
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Prerequisite:							
1.	Signals and system, Digital signal processing						
Course Objectives:							
1.	To introduce wireless fundamentals and statistical multipath models						
2.	To have the knowledge to improve the coverage and capacity and the propagation models.						
3.	To gain the knowledge on modulation techniques, Multiple Access techniques and Coders used in MC.						
Unit I	WIRELESS FUNDAMENTALS			9	+	0	
Cellular concept - Path loss and shadowing - Radio Wave Propagation - Transmit and Receive Signal Models - Free-Space Path Loss - Ray Tracing - Empirical Path Loss Models - Simplified Path Loss Model - Shadow Fading - Combined Path Loss and Shadowing.							
Unit II	STATISTICAL MULTIPATH MODELS			9	+	0	
Time -Varying Channel Impulse Response - Narrowband Fading Models - Wideband Fading Model - Capacity Analysis: Capacity of Flat fading Channels - Channel and system model - Channel Distribution Information(CDI) - Channel Side Information at Receiver - Channel Side Information at transmitter and receiver - Capacity of frequency selective fading Channels - Time Invariant Channels - Time varying Channels.							
Unit III	MULTIPLE ACCESS AND MODULATION TECHNIQUES			9	+	0	
Multiple Access Techniques: FDMA – TDMA - SS Multiple Access – SDMA -Capacity of Cellular CDMA - Capacity of CDMA with Multiple Cells - Capacity of SDMA - Constant Envelope Modulation: BFSK - MFSK - GMSK - Combined Linear and Constant Envelope Modulation Techniques - Spread Spectrum Modulation Techniques - Performance of Digital Modulation in Slow Flat Fading and Frequency Selective Mobile Channels.							
Unit IV	SPATIAL DIVERSITY			9	+	0	
Transmit Diversity: Channel known at transmitter - Channel unknown at transmitter - Alamouti scheme - Receive Diversity: Selection combining - Equal Gain combining - Threshold Combining - Maximal Ratio Combining - Spatial Multiplexing in MIMO - Moment Generating functions in diversity analysis - Receiver structures: Maximum Likelihood Receiver - Zero forcing receiver - Minimum Mean Square Error Receiver - V-BLAST Receiver.							
UNIT V	SPEECH CODING AND WIRELESS SYSTEMS AND STANDARDS			9	+	0	
Speech Coding: Characteristics of speech signals – Vocoder - Linear Predictive Coders - Choosing speech Codecs for mobile communication - GSM Codec - USDC Codec - Standards: AMPS - GSM - CDMA - Digital Cellular Standard(IS-95) - CT2 - DECT- PACS -PDC.							
				Total (L+T)= 45 Periods			
Course Outcomes:							
Upon completion of this course, the students will be able to:							
CO1	:	Classify the available wireless communication systems and standards.					
CO2	:	Analyse various propagation mechanism models, small& large scale and multipath fading models in mobile environment.					
CO3	:	Select the modulation techniques and multiple access techniques for mobile environment.					
CO4	:	Analyze the speech signal parameters and identify Codecs for mobile communication.					
Text Books:							
1.	Theodore S.Rappaport , “Wireless Communications: Principles and Practice”, 2 nd Edition.”, Pearson, 2009.						
2.	Andrea Goldsmith, “ Wireless Communications”, Cambridge University Press, 2005						
Reference Books:							
1.	A.Molisch,Wiley, “Wireless Communications”, 2 nd Edition, 2013						
2.	V.K. Garg,” IS-95 CDMA and CDMA 2000”, Pearson, 2012						
3.	Simon Haykin S., "Digital Communication", Student Edition, John Wiley and Sons, 2010.						
4.	W. Tomasi, “Advanced Electronic Communication Systems”, 6 th Edition, Pearson Education, 2003.						
E-References:							
1.	http://www.pdfdownload.com/download-pdf-for-free/wireless+communication+rappaport						
2.	https://www.udemy.com/topic/wireless-networking/						
3.	https://nptel.ac.in/courses/117102062/						