22EC703	WIRELESS AND MOBILE COMMUNICATION				SEMESTER VII
PREREQUISITES		**CATEGORY**	**PC**	**Credit**	**3**
		Hours/Week	**L**	**T**	**P**	**TH**
1.	Digital Communication		**3**	**0**	**0**	**3**

Course Objectives:

1. To make the students understand the basics of wireless and mobile communication
2. To understand the basics and design if cellular system.
3. To have an insight into the various propagation models and the speech coders used in mobile communication

Unit I	**INTRODUCTION AND MODERN WIRELESS COMMUNICATION SYSTEMS**	**9**	**0**	**0**	**9**

Introduction to wireless communications - History and evolution – Mobile radio system around the world – Examples of common wireless communication systems - Trends in cellular radio and personal communications - Modern wireless communication systems: 2G Cellular networks – 3G wireless networks - 4G mobile web access - 5G faster wireless network - Wireless network standards

Unit II	**THE CELLULAR CONCEPT: SYSTEM DESIGN FUNDAMENTALS AND MODULATION TECHNIQUES FOR MOBILE RADIO**	**9**	**0**	**0**	**9**

Frequency reuse - Channel Assignment strategies - Handoff strategies - Interference and system capacity -Trunking and grade of service - Improving coverage and capacity in cellular systems - Modulation: Combined linear and Constant envelope modulation techniques: Mary PSK, M_ ary QAM, M _ ary FSK and OFDM.

Unit III	**MOBILE RADIO PROPAGATION:LARGE SCALE PATH LOSS**	**9**	**0**	**0**	**9**

Introduction to Radio wave propagation - Free-space propagation model - 3 basic propagation mechanisms and models: reflection - Ground reflection model – Diffraction - Knife-edge diffraction model -Scattering – radar cross section model - Practical Link budget design using path loss models - Outdoor propagation models - Indoor propagation models

Unit IV	**MOBILE RADIO PROPAGATION:SMALL-SCALE FADING AND**	**9**	**0**	**0**	**9**

Small-Scale fading: Small scale multipath propagation - Impulse response model of a multipath channel - Small-scale multipath measurements - Parameters of mobile multipath channels – Types of small-scale fading- Introduction to shape factors: Angular spread - Angular constriction - Azimuthal Direction of maximum fading.

Unit V	**EQUALISATION,DIVERSITY AND CHANNEL CODING**	**9**	**0**	**0**	**9**

Equalisation: Fundamentals – Training a generic adaptive equalizer – Equalizers in a communication receiver -Survey of equalization - Linear equalizers - Nonlinear equalization - Algorithms for adaptive equalization – Diversity: Practical Space Diversity Considerations - Polarization diversity -Frequency diversity -Time diversity - RAKE receiver – coding: Speech coding – Vocoders - LPC-Choosing Speech Codecs for Mobile communication - GSM codec - USDC codec

Total (45L) = 45 periods

Text Books:

1. Theodore S.Rappaport , "Wireless Communications: Principles and Practice", 2nd Edition.", Pearson,2012.
2. Simon Haykin, "Digital Communications" Student Edition, John Wiley & sons, 2008.

Reference Books:

1. A.Molisch,Wiley, "Wireless Communications", 2nd Edition, 2010.
2. V.K. Garg, "Principles and Applications of GSM", Pearson Edition.
3. V.K. Garg, "IS-95 CDMA and CDMA 2000", Pearson Edition.
4. S. Haykins, "Communication Systems", 5th Edition, John wiley, 2008.

E-References:	
1.	http://www.pdfsdownload.com/download-pdf-for-free/wireless+communication+rappaport
2.	https://www.oreilly.com/library/view/wireless-communications-principles/0130422320/
3.	https://en.wikipedia.org/wiki/Adaptive_equalizer

Course Outcomes: Upon completion of this course, the students will be able to:			Bloom's Taxonomy Mapped
CO1	:	Characterize a wireless channel and evolve the system design specifications and understand the difference between wireless compared to wired counterpart.	L2
CO2	:	Design a cellular system, with improved coverage and capacity with the cell structure based on the resource availability and traffic demands and able to calculate interference.	L3
CO3	:	Identify various propagation effects and calculate large scale path loss.	L3
CO4	:	Analyze small scale and multipath fading in mobile environment.	L2
CO5	:	Exploit multiple antenna techniques for capacity / performance gains and design equalizer.	L2

COURSE ARTICULATION MATRIX

Cos/Pos	PO1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO12	PSO 1	PSO2	PSO3
CO1		1	1	2	1								1	2	1
CO2	2	1	2	2	1								1	2	2
CO3	1	1	1	1	1								1	2	1
CO4	1	1	2	1	1								1	2	1
CO5	1	1	1	1	1								1	2	1
Avg	1	1	1.4	1.4	1								1	2	1.2
3/2/1 – indicates strength of correlation (3-High,2- Medium,1- Low)															