3EC81: INTRODUCTION TO CELLULAR COMMUNICATION
CREDITS - 3 (LTP: 3,0,0)

Course Objective:
To understand the concept of mobile communication, frequency reuse, wireless model, GSM & CDMA network, various wireless protocols & its applications related to mobile communication.

Teaching and Assessment Scheme:

Teaching Scheme (Hours per Week)			Credits	Assessment Scheme				
L	T	P	C	Theory Marks		Practical Marks		Total Marks
				ESE	CE	ESE	CE	
3	0	0	3	60	40	00	00	100

Course Contents:

Unit No.	Topics	Teaching Hours
1.	**Evolution of Mobile Communication Systems :** Introduction-base station, mobile station, MSC, forward and reverse channel, control channel, Paging system, Cordless telephone system, Cellular telephone system, Advantages and disadvantages of mobile communications, Comparison of wireless systems, applications of wireless communications.	04
2.	**Cellular Concept – System Design Fundamentals :** Introduction, frequency reuse, channel assignment strategies, handoff strategies, umbrella cell concept, interference and system capacity, co-channel and adjacent channel interference, cell splitting, sectoring, microcell zone concept.	06
3.	**Mobile Communication Engineering :** Introduction, Radio paths, Propagation attenuation, Basic propagation mechanisms, mobile radio channel, simulation of wireless fading channels, free space propagation model, outdoor propagation model.	08
4.	**GSM & CDMA Systems :** GSM network architecture, GSM signaling protocol architecture, Identifier used in GSM systems, GSM speech coding, authentication and security in GSM, GSM call procedures, GSM handoff procedures, GSM services and features, Concept of spread spectrum, CDMA architecture.	12
5.	**3G and 4G Digital Mobile Technology :** 2.5G TDMA evolution path, GPRS technology, EDGE technology, 2.5G CDMA technology, Need of 3G and 4G mobile networks, IMT-2000	09

Unit No.	Topics	Teaching Hours
	Global standards, UMTS technology, W-CDMA air interface, TD-SCDMA technology, CDMA 2000 technology. 4G-LTE.	
6.	**Emerging Wireless Network Technologies :** IEEE 802.11 WLAN technology, IEEE 802.15 WPAN technology, IEEE 802.16 WMAN technology, Mobile adhoc networks (MANETs), Wireless sensor networks, RFID technology, IEEE 802.21 standards overview, Case studies of latest wireless technologies.	06
	Total	**45**

List of References:

1. T. L. Singal, *"Wireless Communications"*, Tata McGraw Hill , 2nd Edition, 2011.
2. T. S. Rappaport, *"Wireless Communications: Principles and practice"*, Pearson, 2nd Edition, 2010.
3. A. Goldsmith, "*Wireless Communications*", Cambridge university press, 1st Edition, 2005.
4. B. Razavi, "*RF Microelectronics",* Prentice Hall, 1st Edition, 1998.
5. W.C.Y. Lee, *"Mobile Communications Engineering"*, McGraw Hill Telecomm., 2nd Edition, 1998.

Course Outcomes (COs) :

By learning this course students will be able to …

1. Understand the basics of mobile communication systems.
2. Design the cellular system and improve the coverage and capacity of system.
3. Analyze and design the various mobile propagation model.
4. Design GSM and CDMA wireless networks.
5. Study the 3G and 4G digital mobile technology.
6. Compare the recent emerging protocol of wireless communication system.