IV B.Tech – II Semester
(17EC802) CELLULAR AND MOBILE COMMUNICATIONS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	3

Pre-Requisites: Analog & Digital Communications, Antenna & Wave propagation

Course Objectives:
- To provide the basic principles and techniques used in Cognitive Radio.
- To introduce Software defined radio and cognitive radio with their architectures, spectrum sensing, accessing and sharing techniques of cognitive radio.

UNIT-I:
CELLULAR MOBILE RADIO SYSTEMS: Introduction to Cellular Mobile System, uniqueness of mobile radio environment, operation of cellular systems, consideration of the components of Cellular system, Hexagonal shaped cells, Analog and Digital Cellular systems.
CELLULAR CONCEPTS: Evolution of Cellular systems, Concept of frequency reuse, frequency reuse ratio, Number of channels in a cellular system, Cellular traffic: trunking and blocking, Grade of Service; Cellular structures: macro, micro, pico and femto cells; Cell splitting, Cell sectoring.

UNIT-II:
INTERFERENCE: Types of interferences, Introduction to Co-Channel Interference, real time Co-Channel interference, Co-Channel measurement, Co-channel Interference Reduction Factor, desired C/I from a normal case in a omni directional Antenna system, design of Antenna system, antenna parameters and their effects, diversity receiver, non-cochannel interference-different types.

UNIT-III:
FREQUENCY MANAGEMENT AND CHANNEL ASSIGNMENT: Numbering and grouping, setup access and paging channels, channel assignments to cell sites and mobile units: fixed channel and non-fixed channel assignment, channel sharing and borrowing, overlaid cells. CELL COVERAGE FOR SIGNAL AND TRAFFIC: Signal reflections in flat and hilly terrain, effect of human made structures, phase difference between direct and reflected paths, straight line path loss slope, general formula for mobile propagation over water and flat open area, near and long distance propagation, antenna height gain, form of a point to point model.

UNIT-IV:
CELL SITE AND MOBILE ANTENNAS: Sum and difference patterns and their synthesis, omni directional antennas, directional antennas for interference reduction, space diversity antennas, umbrella pattern antennas, minimum separation of cell site antennas, high gain antennas.

UNIT-V:
HANDOFF STRATEGIES: Concept of Handoff, types of handoff, handoff initiation, delaying handoff, forced handoff, mobile assigned handoff, intersystem handoff, vehicle locating methods, dropped call rates and their evaluation.

UNIT-VI:
DIGITAL CELLULAR NETWORKS: GSM architecture, GSM channels, multiple access schemes; TDMA, CDMA, OFDMA; architecture of 3G cellular systems.

Course Outcomes:

After successful completion of the course, the students can be able to:

S. No	Course Outcome	BTL
1.	Understand the infrastructure to develop mobile communication systems (cellular theory) and the characteristics of different multiple access techniques in mobile communication.	L2
2.	To motivate the students to pursue research in the area of wireless communication.	L2
3.	Analyze the measures to increase the capacity in GSM systems and the entire protocol architecture of GSM	L3
4.	Analyze the different inter-networking challenges and solutions in wireless mobile networks-Network and Transport Layers.	L3
5.	Develop applications that are mobile-device specific and demonstrate current practice in mobile communication contexts.	L3
6.	Understand the architectures of various cellular systems	L2

Correlation of COs with POs & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	2	3	3	-	-	-	-	-	2	-	-	1	2	-
CO 2	2	3	2	-	2	-	-	-	3	-	-	2	3	2
CO 3	2	-	3	-	2	-	-	-	3	-	-	1	2	2
CO 4	2	3	3	-	-	-	-	-	3	-	-	1	2	-
CO 5	2	3	3	-	-	-	-	-	2	-	-	2	2	2
CO 6	2	2	-	-	-	-	-	-	-	-	-	2	3	2

Text Books:

1. Mobile Cellular Telecommunications – W.C.Y. Lee, Tata McGraw Hill, 2rd Edn., 2006.
2. Principles of Mobile Communications – Gordon L. Stuber, Springer International 2nd Edition, 2007.

Reference Books:

1. Wireless Communications – Theodore. S. Rapport, Pearson education, 2nd Edn., 2002.
2. Wireless and Mobile Communications – Lee McGraw Hills, 3rd Edition, 2006.
3. Mobile Cellular Communication – G Sasibhushana Rao Pearson
4. Wireless Communication and Networking – Jon W. Mark and Weihua Zhqung, PHI,2005.
5. Wireless Communication Technology – R. Blake, Thompson Asia Pvt. Ltd., 2004.