IV B.Tech – I Semester

(20EC7438) FUNDAMENTALS OF CELLULAR AND MOBILE COMMUNICATIONS
(Open Elective-III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	0	0	3

Pre-Requisites: Analog & Digital Communications

Course Objectives:

- Understand the basic concept of cellular mobile systems
- Introduce various types of interference in cellular mobile system
- Demonstrate frequency management and channel assignment concepts
- Understand the handoff mechanism in cellular mobile communication
- Introduce all cellular standards from 2G to 5G

UNIT–I:
Introduction to cellular mobile systems – Basic Cellular System – Cellular communication infrastructure: Cells – Clusters – Cell Splitting – Frequency reuse concept and reuse distance calculation – Cellular system components – Operations of cellular systems.

UNIT–II:
Introduction to Co-Channel Interference, real time Co- Channel interference, Co-Channel measurement, non-cochannel interference-different types. Signal reflections in flat and hilly terrain, effect of human made structures. Introduction to mobile antennas.

UNIT–III:
Frequency Management and Channel Assignment: Numbering and grouping, setup access and paging channels channel assignments to cell sites and mobile units, channel sharing and borrowing, sectorization, overlaid cells, non fixed channel assignment.

UNIT–IV:
Handoff, dropped calls and cell splitting, types of handoff, handoff invitation, delaying handoff, forced handoff, mobile assigned handoff. Intersystem handoff, cell splitting, micro cells, vehicle locating methods.

UNIT–V:
Introduction to modern cellular standards – 2G Architecture such as GSM and CDMA based – 2.5G – GPRS: GPRS and its features – GPRS network architecture – GPRS protocol architecture

– GPRS backbone network – 3G standard details such as UMTS – Introduction to 4G, LTE and 5G .

Course Outcomes:

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

S.No	Course Outcome	BTL
1	Explain the basic concepts of cellular mobile system	L2
2	Demonstrate co-channel and non co-channel interferences	L2
3	Utilize the concepts of frequency management and channel assignment concepts	L3
4	Justify which type of handoff mechanism is to be used under various circumstances	L5
5	Define all cellular standards from 2G to 5G	L1

Correlation of Cos with Pos & PSOs:

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

Text Books:

1. Mobile Cellular Telecommunications – W.C.Y. Lee, Tata McGraw Hill, 2rd Edn., 2006.
2. Wireless Communications - Theodore. S. Rapport, Pearson education, 2nd Edn., 2002.
3. Mobile Cellular Communication – G Sasibhushana Rao, Pearson Education, 2012.
4. Principles of Mobile Communications – Gordon L. Stuber, Springer International 2nd Edition, 2007.

Reference Books:

1. Wireless and Mobile Communications – Lee McGraw Hills, 3rd Edition, 2006.
2. Wireless Communication and Networking – Jon W. Mark and Weihua Zhqung, PHI, 2005.
3. Andrea Goldsmith, “Wireless Communications”, Cambridge University Press, First Edition, 2005.
4. Wireless Communication and Networking - William Stallings, PHI, 2003.
5. 4G, LTE-Advanced Pro and The Road to 5G - Erik Dahlman, Stefan Parkvall, &Johan Sko¨Id, 3rd edition, Elsevier,2016.