

**III B.Tech - I Semester**  
**(20EC5738) INTRODUCTION TO CELLULAR AND MOBILE COMMUNICATIONS**  
**(Minors)**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	4

**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
CO1	2	1	-	-	-	-	-	-	-	-	-	-	2	-
CO2	2	1	1	-	-	-	-	-	-	-	-	-	2	-
CO3	2	1	1	-	-	-	-	-	-	-	-	-	2	-
CO4	2	1	1	-	-	-	-	-	-	-	-	-	2	-
CO5	2	1	1	-	-	1	1	-	-	-	-	2	2	-

**Text Books:**

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

**Reference Books:**

1. Wireless and Mobile Communications – Lee McGraw Hills, 3<sup>rd</sup> 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, 3<sup>rd</sup> edition, Elsevier, 2016.