

<b>Wireless Communication and Networks</b>	<b>L</b>	<b>P</b>	<b>C</b>
	<b>3</b>		<b>3</b>

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
CSE-NET	6	PC	PC	WMC-340T
EAE	6	WMC-EAE	WMC-EAE-1C	WMC-336T
IT	7	PCE	PCE-4	CIE-415T

<b>Marking Scheme:</b>												
1. Teachers Continuous Evaluation: 25 marks												
2. Term end Theory Examinations: 75 marks												
<b>Instructions for paper setter:</b>												
1. There should be 9 questions in the term end examinations question paper.												
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.												
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.												
4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.												
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.												
<b>Course Objectives :</b>												
1.	To know the evolution, principles and architecture of cellular systems and various concepts associated with mobility management and network signaling											
2.	To study design and operation of various 2G systems (GSM/GPRS/IS-95/UMTS).											
3.	To know features and technical aspects of 3G/4G standards evolved from IMT 2000 vision.											
4.	To know technical standards related to 4G, 5G, Bluetooth, Zigbee, NFC, WiMAX.											
<b>Course Outcomes (CO)</b>												
<b>CO 1</b>	Understand the evolution, principles and architecture of cellular systems and various concepts associated with mobility management and network signaling.											
<b>CO 2</b>	Develop an understanding of design and operation of various 2G systems (GSM/GPRS/IS-95/CDMA).											
<b>CO 3</b>	Analyze the features and technical aspects of 3G standards evolved from IMT 2000 vision											
<b>CO 4</b>	Analyze the features and technical aspects of 4G, 5G, Bluetooth, Zigbee, NFC and WiMax standards											
<b>Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)</b>												
	<b>PO01</b>	<b>PO02</b>	<b>PO03</b>	<b>PO04</b>	<b>PO05</b>	<b>PO06</b>	<b>PO07</b>	<b>PO08</b>	<b>PO09</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO 1</b>	3	1	2	3	3	2	2	-	2	2	3	3
<b>CO 2</b>	3	1	2	2	2	2	3	-	3	2	2	3
<b>CO 3</b>	3	3	3	2	3	2	3	-	2	2	3	2
<b>CO 4</b>	3	3	3	3	3	3	2	-	2	3	3	2
<b>UNIT I</b>												
Introduction To Wireless Communication Systems: Evolution of mobile radio communications; Overview of generations of cellular systems, comparison of various wireless systems.												
Introduction to Personal Communication Services (PCS): PCS architecture, Mobility management, Networks signaling. A basic cellular system, multiple access techniques: FDMA, TDMA, CDMA.												
Introduction to Wireless Channels and Diversity: Fast Fading Wireless Channel Modeling, Rayleigh/Ricean, Fading Channels, BER Performance in Fading Channels, Introduction to different modulation technique.												

**UNIT II**

2G Networks: AMPS, ETACS, GSM: GSM Architecture, Mobility Management, Network signalling, mobile management, voice signal processing and coding, 2.5G Mobile Data Networks: Introduction to Mobile Data Networks, General Packet Radio Services (GPRS): GPRS architecture, GPRS Network nodes, EDGE, Mobile IP, CDMA IS-95: Spread Spectrum, Frequency and Channel Specifications, Forward and Reverse CDMA Channel, Near-Far Problem, Power Control, Spread Spectrum Systems Cellular Code Division Access Systems-Principle, Power Control, effects of multipath propagation on code division multiple access.

**UNIT III**

Third Generation (3G) Mobile Services: The Universal Mobile Telecommunication System (UMTS) & CDMA 2000 standards, UMTS Network Architecture Release 99, UMTS Interfaces, UMTS Network Evolution, UMTS Channels, UMTS Time Slots.

**UNIT IV**

Evolution of Generations: Features of 4G (LTE & VoLTE), 5G, Bluetooth: Architecture, Feature, Frequency Band, Master-Slave, IEEE Standard, Zigbee: Architecture, Feature, Frequency Band, IEEE Standard, NFC: IEEE Standard, Architecture, Feature, IEEE 802.16 (WiMax): Standard Architecture, Spectrum Allocation, Overview of WiMAX PHY, MAC Layer, Scheduling services, UGS, rtPS, nrtPS, Best Effort (BE).

**Textbook(s):**

1. Raj Pandya, "Mobile & Personnel communication Systems and Services", Prentice Hall India, 2001.
2. Theodore S. Rappaport, "Wireless Communication- Principles and practices," 2nd Ed., Pearson Education Pvt. Ltd, 5th Edition, 2008.
3. Wireless Networks: Applications and Protocols, T.S Rappaport, Pearson Education.
4. Wireless Communication and Networks: 3G and Beyond, I. Saha Mishra, TMH Education

**References:**

1. T.L.Singhal "Wireless Communication", Tata McGraw Hill Publication.
2. Jochen Schiller, "Mobile communications," Pearson Education Pvt. Ltd., 2002.
3. Yi –Bing Lin & Imrich Chlamatac, "Wireless and Mobile Networks Architecture," John Wiley & Sons, 2001.
4. Lee, W.C.Y., "Mobile Cellular Telecommunication", 2nd Edition, McGraw Hill, 1998.
5. Smith & Collins, "3G Wireless Networks," TMH, 2007
6. Schiller, Jochen, "Mobile Communications", 2nd Edition, Addison Wesley.