Program : **Diploma in Electronics Engineering / Electronics and Communication Engineering**	
Course Code : **5202**	Course Title: **Mobile & Wireless Communication**
Semester : **5/5**	Credits: **4**
Course Category: **Program Elective/ Elective**	
Periods per week: **4 (L:4, T:0, P:0)**	Periods per semester: **60**

Course Objectives:

- To provide the students with the conceptual knowledge of mobile and wireless communications.
- To imbibe the fundamental ideas of cellular communication, multiple access, and IEEE wireless standards.
- To discuss and provide basic knowledge of different generations of mobile communication.

Course Prerequisites:

Topic	Course code	Course Title	Semester
Noises in communication systems	3042	Principles of Electronic Communication	3

Course Outcomes:

On completion of the course, the student will be able to:

COn	Description	Duration (Hours)	Cognitive level
CO1	Summarize the various system level concepts of Cellular Communication and multiple access methods	14	Understanding
CO2	Illustrate the fundamentals of second-generation mobile systems	14	Understanding
CO3	Explain features and architecture of third generation mobile networks and IEEE wireless standards	16	Understanding
CO4	Outline the trends in next generation mobile networks	14	Understanding

	Series test	2	

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2						
CO2	2						
CO3	2						
CO4	2						

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

Course Outline:

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	**Summarize the various system level concepts of Cellular Communication and multiple access methods**		
M1.01	Summarize the concepts of mobile communications.	2	Understanding
M1.02	Discuss the methods to improve coverage and capacity of cellular systems	2	Understanding
M1.03	Illustrate the basic operations of a cellular system	4	Understanding
M1.04	Explain the different Multiple Access Techniques in a Cellular system.	3	Understanding
M1.05	Give an overview of Indian Telecom Industry and regulatory bodies.	3	Understanding
Contents: **Principles Of Cellular Networks:** Cellular Network Organization - Frequency Reuse-Increasing Capacity Through Network Densification - Operation of Cellular Systems - Mobile Cellular Call Scenario - Mobile Radio Propagation Effects - Handoff - Power Control - Basics of Traffic Engineering - Multiple Access Techniques - FDMA, TDMA, SSMA, SDMA - First Generation Wireless Networks - Overview of Indian Telecom Industry -Telecom Regulatory bodies in India - National Telecom Policy			
CO2	**Illustrate the fundamentals of second-generation mobile systems**		
M2.01	Illustrate the working of GSM system	3	Understanding
M2.02	Outline the salient features of GSM Air Interfaces and Radio Channels	4	Understanding
M2.03	Interpret CAMEL and its use in a mobile network	3	Understanding
M2.04	Summarize the methods to increase the datarate in second generation wireless system	4	Understanding

	Series Test 1	1	
Contents: **Second Generation Mobile Networks:** Global System for Mobile Communications (GSM) - The GSM Subsystems - Network Subsystem - BSS Subsystem - Authentication Process - Short Messaging Service - GSM Air Interface - GSM Radio Channels - Mobile Device - Intelligent Network Subsystem and CAMEL - Overview of General Packet Radio Service (GPRS) and EDGE - CDMA Standard-IS 95			
CO3	**Explain features and architecture of third generation mobile networks and IEEE wireless standards.**		
M3.01	Distinguish between different releases of third generation mobile networks	4	Understanding
M3.02	Explain the concepts of WiMAX and significance of mobile WiMAX	4	Understanding
M3.03	Illustrate 802.11 standard and its configuration.	4	Understanding
M3.04	Outline the features and applications of Bluetooth	4	Understanding
Contents: **Third Generation Mobile Networks &IEEE Wireless Technologies:** UMTS Architecture based on different releases by 3GPP - New Concepts of UMTS - UMTS CDMA Concepts - Spreading Factor, Chip Rate, Process Gain, OVSF Code Tree - IEEE 802.16 and WiMAX - overview - Mobile WiMAX: 802.16e - Wireless LAN-802.11-Transmission Speeds and Standards - WLAN Configurations: From Ad Hoc to Wireless Bridging - Wireless LAN Security - IEEE 802.11e and WMM - Overview and Applications of Bluetooth - Bluetooth Protocol Stack			
CO4	**Outline the trends in next generation mobile networks.**		
M4.01	Explain the difference between LTE and LTE-A	3	Understanding
M4.02	Compare and contrast between Machine Type Communication and IoT	3	Understanding
M4.03	Illustrate the implementation of IoT in a cellular network	4	Understanding
M4.04	Show the evolution and features of 5G.	4	Understanding
	Series Test II	1	
Contents: **Fourth and Fifth Generation Mobile Networks:** Long Term Evolution (LTE) - Network Architecture and Interfaces - Voice and SMS over LTE -LTE-Advanced (3GPP Release 10) - Machine Type Communication and the Internet of Things - NB-IoT - From LTE to 5G - New Radio for 5G - Radio Network Evolution for			

5G - Core Network Evolution for 5G

Text / Reference:

T/R	Book Title/Author
T1	From GSM to LTE-Advanced Pro and 5G- An Introduction to Mobile Networks and Mobile Broadband -Third Edition- Martin Sauter-John Wiley and Sons, Ltd., Publication
R2	Theodore S. Rappaport, 'Wireless Communication Principles and Practice', 2nd Edn., Pearson Education India
R3	Wireless Communication Networks and Systems Global Edition, Cory Beard & William Stallings, Pearson Education Limited 2016
R4	An Introduction To LTE- LTE, LTE-Advanced, SAE, VoLTE and 4G Mobile Communications - Second Edition -Christopher Cox- John Wiley and Sons, Ltd., Publication

Online Resources:

Sl.No	Website Link
1	https://www.3gpp.org/
2	http://www.3gpp2.org/
3	https://www.ngmn.org/
4	https://www.gsma.com/
5	https://www.ieee.org/standards/
6	https://www.trai.gov.in/