Wireless Networks

B.Tech (PE01)

Lectures	:	3 Hours / Week	Tutorial	:	0	Practical	:	0
CIA Marks	:	30	SEE Marks	:	70	Credits	:	3

Prerequisites:

Computer Networks (20IT502)

Course Objectives:

Students will be able to

CO1: Understand history, reference model of communication, properties of wireless transmission and different medium access control mechanisms.

CO2: Understand architecture of different telecommunication systems and satellite systems.

CO3: Understand architecture and layers of wireless local area networks and network layer for wireless environment.

CO4: Understand routing protocols for mobile ad-hoc networks, transport layer for wireless networks and architecture of wireless application protocol.

Course Outcomes:

After the course the students are expected to be able to

CLO1: Understand the mobile communication systems and the characteristics of different multiple access techniques in mobile communication

CLO2: Learns about 2G mobile communication system, DECT, TETRA and 3G Technology. Learns about basics, routing, and localization of satellite systems.

CLO3: Learns about Wireless LAN architecture and protocols used. Learns about Mobile Network Layer. Learns about Routing Algorithms for Ad Hoc Networks.

CLO4: Learns about Mobile Transport Layer. Learns about architecture of wireless application protocol.

Mapping of Course Learning Outcomes with POs and Program Specific Outcomes(PSOs):

CLO/OCs	Program Outcomes(POs)												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLO 1	1	1	2	-	1	-	1	1	-	2	2	-	1	2	2
CLO 2	1	-	2	-	1	2	1	-	1	-	-	1	2	1	1
CLO 3	-	-	1	1	1	-	-	-	-	1	1	1	1	2	2
CLO 4	1	2	1	2	2	1	-	-	-	1	1	-	1	2	1

UNIT - I **(12 Hours)**

Introduction: Applications, Short History of Wireless Communications, Simplified Reference Model.
Wireless Transmission: Frequencies, Signals, Signal Propagation, Multiplexing, Modulation, Spread Spectrum, and Cellular Systems.

Medium Access Control: Motivation for a Specialized MAC, SDMA, FDMA, TDMA, CDMA, and Comparison.

UNIT - II **(12 Hours)**

Telecommunication Systems: GSM, UMTS and IMT-2000: System Architecture and Radio Interface.
Long Term Evolution (LTE) and LTE Advanced Pro : Introduction and Overview, Network Architecture and Interfaces.

Satellite Systems: History, Applications, Basics, Routing, Localization, and Handover.

UNIT - III **(12 Hours)**

Wireless LAN: Infrared Vs. Radio Transmission, Infrastructure and Ad Hoc Networks, IEEE 802.11: System Architecture, Protocol Architecture, Physical Layer, MAC Layer, and MAC Management.
Mobile Network Layer: Mobile IP: Entities and Terminology, IP packet delivery, Agent discovery, Registration, and Tunneling and Encapsulation, Dynamic Host Configuration Protocol. Ad Hoc Networks.

UNIT - IV **(12 Hours)**

Mobile Transport Layer: Traditional TCP, Classical TCP Improvements: Indirect TCP, Snooping TCP, Mobile TCP, Fast Retransmit / Fast Recovery, Transmission / Time-Out Freezing, Selective Retransmission, and Transaction Oriented TCP.
Support for Mobility: Wireless Application Protocol: Architecture, Wireless Datagram Protocol, Wireless Transport Layer Security, Wireless Transaction Protocol, Wireless Session protocol, and Wireless Application Environment.

TEXT BOOKS:

1. Jochen. Schiller. *Mobile communications*. Addison-Wesley, 2 edition, 2003. ISBN 9780321123817
2. Martin Sauter. *From GSM to LTE-Advanced Pro and 5G: An Introduction to Mobile Networks and Mobile Broadband*. John Wiley & Sons, 3 edition, 2017. ISBN 9781119346906

REFERENCES:

1.

2. UWE Hansmann, Lother Merk, Martin S. Nicklous, and Thomas Stober. *Principles of Mobile Computing*. Addison-Wesley, 1 edition, 2020. ISBN 9780321564085