

Devi Ahilya University, Indore, India Institute of Engineering & Technology				III Year B.E. (Information Technology (Full Time))		
Subject Code & Name		Instructions Hours per Semester & Credits				
5RIOE1 Wireless Protocols and Mobile Networks		Classroom Instruction (CI)	Lab Instruct ion (LI)	Term Work (TW) and Self Learning (SL)	Total no. of Hours Per semeste	Total Credits (Total Hours/30)
Duration of Theory Paper: 3 Hours		L	T	P	TW+SL	90
		20	10	0	60	

### Learning Objectives:

- Understand the fundamentals of wireless communication concepts.
- Analyze the architecture and components of wireless network systems.
- Develop skills in configuring, deploying, and managing wireless networks.
- Evaluate security, privacy, and reliability challenges in wireless networks.

### Prerequisites: Computer Networks

#### Course Outcomes (CO) and Program Outcomes (PO) Mapping

CO No.	Course Outcome	Program Outcomes (PO)
CO1	Explain the fundamentals of wireless networks and various wireless service models.	PO 1, PO 4, PO 11
CO2	Analyze wireless and cellular MAC mechanisms	PO2, PO3, PO5, PO9
CO3	Evaluate wireless LAN and personal area network technologies,	PO6, PO10, PO10
CO4	Apply mobile network and transport layer mechanisms	PO7, PO8, PO11,
CO5	Examine mobile ad hoc networks (MANETs), emerging wireless technologies (5G and beyond), IoT/IoE, opportunistic networks, wireless sensor networks,	PO2, PO4, PO5, PO10

### CO-PO Relationship Matrix:

CO No.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	3	-	-	-	-	-	-	-	-	1
CO2	-	2	2	-	-	-	-	-	-	2	-
CO3	3	3	3	-	-	-	2	2	-	-	2
CO4	3	-	-	-	-	3	3	2	-	-	2
CO5	-	2	3	-	-	-	3	2	-	-	2

## **UNIT-I**

Introduction: Wireless Networks, Wireless vs Wired Networks, mobile devices, mobile applications, mobile environments and limitations, Wireless transmission-frequencies and regulation, multipath propagation, channel fading, Multiplexing and Modulation techniques, Spread spectrum-DSSS & FHSS.

## **UNIT-II**

Medium Access Control: motivation for specialized MAC, Hidden/Exposed, Near/Far terminal effect, MAC protocols –SDMA,FDMA,TDMA, Reservation Aloha, PRMA, MACA, DSMA etc. Cellular networks : overview, Cellular Concept and Frequency Reuse, Channel Allocation, Call Setup, Cell Handoffs, Location Management, CDMA, GSM- Architecture, GSM-Air Interface, protocols, HLR/VLR, localization & calling, security, GPRS.

## **UNIT-III**

Wireless LAN : Infra vs Radio transmission, infrastructure vs ad hoc network,IEEE 802.11-system and protocol architecture, MAC management, IEEE 802.11 flavours, Bluetooth – architecture, radio and basband layer, L2CAP, IEEE 802.15, WiMax and Zigbee overview.

## **UNIT-IV**

Mobile Network Layer: Entities, Packet delivery, Agent Discovery, Tunneling and encapsulation, optimization, reverse tunnelling, Mobile Transport Layer: Congestion control and implication of mobility, slow start, Mobile TCP – Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/ Fast recovery. Support for Mobility – File System – CODA, WAP – Architecture.

## **UNIT-V**

Mobile Adhoc Networks: Protocols and Routing,Advances in Mobile Technologies: 5G and Beyond, Interne of Things (IoT), Internet of Every Thing (IoE), Wireless Sensor Networks, Mobile Opportunistic Networks Wireless Network Planning and Administration: Wireless Hardware, Wireless Network Design and Deploy, Troubleshooting hardware and connection issues.

## **Learning Outcomes:**

After completing this course, students will be able to understand the fundamental concepts, architecture, and operational principles of wireless networks, and effectively apply them to diverse domains of data communication and modern wireless applications

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## **Recommended Books:**

[1]. Jochen Schiller, Mobile Communications, Pearson Education, 2/e, 2003.

[2]. W. Stalling, Wireless Communications & Networks, Pearson Education, 2/e, 2005.

[3]. Dharma P. Agrawal and Qing-An Zeng, Introduction to Wireless and Mobile Systems, Cengage Publication, 2012. [4]. Wale Soyinka, Wireless Network Administration- A Beginner's Guide, Tata McGraw-Hill Edu, 2010.