

Devi Ahilya Vishwavidhyalaya, Indore, India Institute of Engineering & Technology					III Year B.Tech. (Electronics and Telecommunication Engineering)	
Course Code & Name		Instructions Hours per Semester and Credits				
5RTOE1 COMPUTER NETWORKS	Classroom Instruction (CI)		Lab Instruction (LI)	Term Work (TW) and Self Learning (SL)	Total no. of Hours Per semester	Total Credits (Total Hours/30)
	L	T	P	TW+SL	90	3
	20	10	0	60		

Course Learning Objectives:

After completing this course, students will be able to:

1. Understand the layered architecture of computer networks and the functions of different protocol layers.
2. Explain data communication techniques, transmission media, and physical layer concepts.
3. Analyze the operation of Data Link Layer, Medium Access Control protocols, Ethernet, and Wireless LANs.
4. Understand routing, congestion control, transport protocols, and Internet applications.
5. Apply networking concepts to analyze, troubleshoot, and design simple communication networks.

Prerequisites:

Digital Communication Engineering, IT Technology

COURSE CONTENTS

Unit I: Introduction and Physical Layer

Introduction to Computer Networks, network goals and applications, network topologies, types of networks (LAN, MAN, WAN), protocols and standards, ISO-OSI reference model, TCP/IP reference model, guided transmission media, unguided transmission media, data communication fundamentals, digital transmission, multiplexing, switching techniques, physical layer devices.

Unit II: Data Link Layer – Logical Link Control (LLC)

Functions of the Data Link Layer, design issues, framing techniques, error detection and error correction, flow control, error control protocols, sliding window protocols- Stop and Wait, Go-back-N, Selective repeat, HDLC, Logical Link Control, Data Link Layer devices.

Unit III: MAC Layer, Ethernet and Wi-Fi

Medium Access Control (MAC) principles, random access protocols, controlled access protocols, channelization, Ethernet (IEEE 802.3), Fast Ethernet, Gigabit Ethernet, switched Ethernet, Wireless LAN (IEEE 802.11), Wi-Fi architecture, Bluetooth.

Unit IV: Network Layer and Congestion Control

Network Layer functions, IPv4 addressing, subnetting, Classless Inter-Domain Routing (CIDR), IPv6 overview, routing algorithms, distance vector routing, link state routing, routing protocols (overview), congestion control, Quality of Service (QoS), Internetworking concepts.

Unit V: Transport Layer and Application Layer

Transport Layer concepts, process-to-process delivery, UDP, TCP, connection establishment and termination, flow control, error control, TCP congestion control, Application Layer concepts, DNS, HTTP and HTTPS, FTP, SMTP, POP3 and IMAP, Telnet, DHCP, SNMP, network security basics.

Course Outcomes:

CO.No.	CO
CO1	Explain the fundamentals of computer networks, reference models, transmission media, and Physical Layer concepts
CO2	Analyze framing, error detection/correction, flow control, and Logical Link Control (LLC) mechanisms of the Data Link Layer
CO3	Explain Medium Access Control protocols and evaluate the working of Ethernet and IEEE 802.11 Wireless LAN technologies.
CO4	Analyze Network Layer functionalities including routing algorithms, IP addressing, internetworking, and congestion control mechanisms.
CO5	Explain Transport Layer protocols and Application Layer services used in modern computer networks.

Books Recommended:

- [1] Andrew S. Tanenbaum and David J. Wetherall, *Computer Networks*, Pearson.
- [2] James F. Kurose and Keith W. Ross, *Computer Networking: A Top-Down Approach*, Pearson.
- [3] William Stallings, *Data and Computer Communications*, Pearson.
- [4] Larry L. Peterson and Bruce S. Davie, *Computer Networks: A Systems Approach*.

CO-PO-PSO Relationship

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO 1	PSO 2	PSO 3
5RTOE1.CO1	3	2	-	-	1						1	3	1	-
5RTOE1.CO2	3	3	1	2	2						1	3	2	1

5RTOE1.CO3	3	3	2	1	2	1					1	3	2	1
5RTOE1.CO4	3	3	2	2	2	1					2	3	2	2
5RTOE1.CO5	3	2	2	1	2	1					2	3	2	2