

GANPAT UNIVERSITY				
FACULTY OF DIPLOMA ENGINEERING				
Programme	Diploma in Electronics and Communication Engineering			
Semester	IV		Version	1.0.0.0
Effective from Academic Year	2026-27		Effective for the batch Admitted in	JULY 2025
Course code	1EC4104	Course Name	Computer Networks	

I.TEACHING-LEARNING AND ASSESSMENT SCHEME

Course Type	Course Code	Learning Scheme						Assessment Scheme										Total Marks
		Actual Contact Hrs./Week			SLH	NLH	Credits	Theory				Practical				Based on SL		
		CL	TL	LL				FA-TH	SA-TH	TOTAL		FA-PR	SA-PR	TOTAL		SLA		
								MAX	MAX	MAX	MIN	MAX	MAX	MAX	MIN	MAX	MIN	
VEC	1EC4104	3	-	2	3	8	4	40	60	100	40	30	20	50	20	20	8	170

Abbreviation:-	CL- Classroom Learning	TL- Tutorial Learning	LL-Laboratory Learning
	SLH-Self Learning Hours	NLH-Notional Learning Hours	SLA-Self Learning Assessment
	FA-Formative Assessment (Term work+Mid Sem Exam+ Attendance)		SA-Summative Assessment

II. PRE-REQUISITES

Students should have basic knowledge of basic understanding of data communication concepts

III. INDUSTRY / EMPLOYER EXPECTED OUTCOMES

After successful completion of this course, employers expect diploma graduates to be able to understand and explain real-world computer networking architectures used in LAN, WAN, and Internet-based systems, Configure basic IP addressing, subnetting, and troubleshoot network connectivity issues and Assist network engineers in installation, maintenance, and monitoring of communication networks

IV. COURSE LEARNING OUTCOMES

At the end of the course, students will be able to achieve the following course learning outcomes:

CO1: Explain basic concepts of computer networks, networking models, switching techniques, and network services.

CO2: Analyze and apply OSI and TCP/IP reference models to understand the functioning of network protocols at different layers.

CO3: Configure and analyze IP addressing schemes including IPv4, IPv6, subnetting, and NAT for effective network communication.

CO4: Identify transmission media, networking devices, and perform network troubleshooting using standard diagnostic tools and commands.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT:

Name of Unit	Theory Learning outcomes (TLO's) aligned to CO's	Learning Content mapped with Theory Learning outcomes (TLO's)&CO's	Marks	Hours.
Unit-1 Basic of Computer Network	TLO 1.1 Explain Basics of Networking. TLO 1.2 Describe Types of Networks.	1.1 Definition, Advantages, Applications and different network criteria	10	7

	TLO 1.3 Explain different Network Topologies. TLO 1.4 Explain different types of servers. TLO 1.5 Explain different switching technology in network. TLO 1.6 Fundamentals of basic Networking models	1.2 Application, advantage, disadvantage and working of LAN, WAN, MAN, WLAN. 1.3 Application, advantage, disadvantage and working of BUS, RING, STAR, MASH, and TREE topology. 1.4 Application and use of Web server, File server, Mail server, DNS server, DHCP server, Print server. 1.5 Study and compare Circuit switching and packet switching 1.6 Application and advantage of Peer to Peer and Client-Server model.		
Unit-2 Network Models	TLO 2.1 Describe the architecture and purpose of the OSI model TLO 2.2 Explain Working Protocol in OSI model. TLO 2.3 Explain the TCP/IP model and its layers. TLO 2.4 Explain Working protocol in TCP/IP model. TLO 2.5 Compare the OSI model and TCP/IP model	2.1 Application and function of all seven layer of OSI model. 2.2 Function of working protocol on each layer (HTTP, TELNET, FTP, TFTP, TCP, UDP, ICMP, IGMP, ARP and RARP). 2.3 Application and function of all four layer of TCP/IP model. 2.4 Advantage of working protocol on each layer (IP, DNS, DHCP, TCP, UDP). 2.5 Highlighting similarities and difference between OSI and TCP/IP models.	10	8
Unit-3 Fundamentals of IP Addressing and Subnetting	TLO 3.1 Explain Concept of network addressing. TLO 3.2 Explain structure of IPv4 packet format. TLO 3.3 Explain different IP address scheme. TLO 3.4 Explain structure of IPv6 packet format. TLO 3.5 Explain Subnetting in network address. TLO 3.6 Explain Static and dynamic IP addressing. TLO 3.7 Give difference between IPv4 and IPv6. TLO 3.8 Explain NAT TLO 3.9 Explain Private and Public IP address.	3.1 Learn about Physical and logical addressing scheme. 3.2 Study and use of IPv4 packet format. 3.3 Study about Address space, Notations, Classful Addressing, Classless Addressing, special and loop back addressing. 3.4 Study and use of IPv6 packet format. 3.5 Application and use of different method of Subnetting. 3.6 Static and Dynamic IP: Comparison and Features. 3.7 State and identified difference between IPv4 and IPv6. 3.8 Application and use of NAT 3.9 Application and advantage of Private and Public IP address.	12	10
Unit-4 Introduction to wireless standards and Transmission Media	TLO 4.1 Fundamentals of Transmission media TLO 4.2 Explain Types of guided media. TLO 4.3 Explain Types of un-guided media.	4.1 Explain different types of Transmission media. 4.2 Explain the use, benefit, and drawback of guided media. 4.3 Explain the use, benefit, and drawback of un-guided media.	16	10

	TLO 4.4 Explain Transmission Impairment. TLO 4.5 IEEE 802.11 Wi-Fi standards. TLO 4.6 Fundamental of Bluetooth technology. TLO 4.7 Explain Bluetooth architecture. TLO 4.8 Explain Bluetooth network topology. TLO 4.9 Explain Bluetooth protocol stack.	4.4 Describe Performance, Wavelength and Media Comparison. 4.5 Describe IEEE 802.11 Wi-Fi standards and them features. 4.6 Application of Bluetooth technology in PAN. 4.7 Illustrate the Bluetooth layered architecture and the role of each layer. 4.8 Application and examples of piconet and scatternet topologies. 4.9 List Bluetooth components (L2CAP, RFCOMM, SDP) with functions.		
Unit-5 Basics of Network Devices and Troubleshooting Tools	TLO 5.1 Introduction of different networking devices. TLO 5.2 Explain working Principal of different Layer devices. TLO 5.3 Difference between different networking devices. TLO 5.4 Explain basic routing Protocol. TLO 5.5 Network troubleshoot Commands. TLO 5.6 Explain different troubleshooting tools. TLO 5.7 Application of Network monitor tool.	5.1 Identify various network devices and them functions (e.g. hub, switch, router, bridge, gateway). 5.2 Explain the working principles and OSI layer association of different network devices. 5.3 Distinguish network devices based on function and application. 5.4 Describe the role of router protocols in network communication. 5.5 Explain the purpose and syntax of basic network commands. 5.6 Describe common network troubleshooting using tools like Wireshark and Packet Tracer 5.7 Apply software tools to monitor and analyse network traffic.	12	10

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL			
SR. NO	PRACTICAL/LABORATORY LEARNING OUTCOME(LLO)	PRACTICAL TITLES	RELEVANT Cos
1	LLO1: Recognize and describe roles of devices like routers, switches, hubs, NICs, cables	Identify and understand functions of networking components and devices	CO1
2	LLO2: Setup and test basic LAN communication between two PC.	Create a simple peer-to-peer (P2P) network	CO1
3	LLO3: Configure systems with both static and DHCP-based IP addressing	Assign static and dynamic IP addresses	CO2
4	LLO4: Divide IP network using subnetting techniques	Subnetting: Calculate and apply IP subnetting for a given network requirement.	CO3
5	LLO5: Plan and configure a working LAN setup for a given requirement	Design and implement a small office LAN	CO1
6	LLO6: Analyse and troubleshoot network connectivity issues using CLI tools	Use of basic network diagnosis commands	CO4
7	LLO7: Make UTP cables correctly and verify functionality	Crimp cross and straight Ethernet Cable using RJ-45 Tester	CO4

8	LLO8: Enable resource sharing on a LAN setup	Share drives, folders, and printers in a local network.	CO1
9	LL09: Analyse packets and understand headers using network protocol analyser.	Capture network traffic using Wireshark or similar packet analyser tool.	CO4
10	LLO10: Apply network security measures to protect systems	Install basic firewall and antivirus software	CO3
11	LLO11: Simulate and verify logical connectivity in virtual networking environments	Use simulation software like Cisco Packet Tracer to design and simulate networks	CO3
12	LL12: Set up and secure a wireless network	Configure a wireless access point and connect devices	CO4

VII. SUGGESTED MICRO PROJECT / ASSIGNMENTS / ACTIVITIES FOR SELF LEARNING / SKILL DEVELOPMENT (SELF LEARNING)

A. Self-Learning Assignments / Activities

- List different versions of network communication model and relevant protocol.
- "A Comparative Study of Wired Network and Wireless Network Based on Key Networking Parameters".
- A Comparative Study of **IPv4, IPv6, and TCP/IP**, highlighting key features and newly introduced improvements.

B. MINI PROJECTS (SKILL DEVELOPMENT FOCUSED)

- Create a mini-LAN setup using 3–5 computers.
- Simulate a network using Cisco Packet Tracer or GNS3.
- Prepare a presentation on real-world applications of computer network.
- Record a screen tutorial: How to use Wireshark for packet analysis
- "Visualizing the Working of Network Routing Algorithms through Animations".

VIII. LIST OF INSTRUMENTS / EQUIPMENT / TRAINER BOARD/SOFTWARE

1	Computer Systems Window/Linux (minimum i3, 4 GB RAM)
2	Network Switch (8/16/24 Port)
3	Wireless Router / Access Point
4	RJ-45 Crimping Tool
5	LAN Tester / Network Cable Tester
6	Packet Tracer / GNS3 Software (Installed)
7	Wireshark (Installed on systems)

IX. LIST OF REFERENCE BOOKS

SR.NO	TITLE	AUTHOR	PUBLICATION
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