

## CS – 20 NETWORK TECHNOLOGY AND ADMINISTRATION

#### **Objectives:**

- Build an understanding of the fundamental concepts of computer networking.
- Familiarize with the basic taxonomy and terminology of the computer networking area and advanced networking.
- Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.

#### Prerequisites:

• Basic knowledge of computer networking.

No	Topics	Details
1	Basics of Network, Network Models and LAN Sharing	<ul> <li>Network concepts         <ul> <li>What is network?</li> <li>Use of network</li> </ul> </li> <li>Network model: peer – to – peer, client – server</li> <li>Network Services         <ul> <li>File service,</li> <li>Print service,</li> <li>Comm. service,</li> <li>Data base service,</li> <li>Security service,</li> <li>Application service</li> </ul> </li> <li>Network Access Methods         <ul> <li>CSMA / CD,</li> <li>CSMA / CD,</li> <li>CSMA / CA,</li> <li>Token passing,</li> <li>Polling</li> </ul> </li> <li>Network Topologies: Bus, Ring, Star, Mesh, Tree, Hybrid</li> <li>Advanced Network Topologies Ethernet, CDDI, FDDI</li> <li>Communication Methods             <ul> <li>Unicasting,</li> <li>Multicasting,</li> <li>Broadcasting</li> </ul> </li> <li>OSI reference model with 7 layers</li> <li>TCP/IP network model with 4 layers</li> </ul>
2	Transmission Media Multiplexing & Switching	<ul> <li>Transmission Media         <ul> <li>Types of Transmission media</li> <li>Guided media</li> <li>Co – Axial Cable, Twisted Pair Cable,</li> <li>Crimping of Twisted pair cable, Fiber Optic Cable</li> </ul> </li> </ul>
	Concepts Network devices	<ul> <li>Unguided media         <ul> <li>Infrared, Laser, Radio, Microwave, Bluetooth tech.</li> </ul> </li> </ul>



# B.Sc.(I.T.) (Honours) & B.Sc.(I.T.) (Honours with Research) (Semester - 3 and Semester - 4) Saurashtra University To be effective from June – 2024

<ul> <li>Multiplexing &amp; De-multiplexing</li> <li>Multiplexing Types         <ul> <li>FDM,</li> <li>TDM,</li> <li>CDM,</li> <li>WDM</li> </ul> </li> <li>Switching Tech.</li> <li>Circuit Switching,</li> <li>Packet Switching,</li> <li>Packet Switching</li> <li>CABLE NETWORK DEVICES</li> <li>LAYER1 DEVICES</li> <li>LAYER1 DEVICES</li> <li>LAN CARD,</li> <li>MODEM,</li> <li>DSL &amp; ADSL</li> <li>HUB(Active, Passive, Smart hub), REPEATER</li> <li>LAYER2 DEVICES</li> <li>SWITCH(Manageable, non- manageable)</li> <li>BRIDGE(Source route, Transactional)</li> <li>LAYER3 DEVICES</li> <li>ROUTER,</li> <li>LAYER3 SWITCH</li> <li>BROUTER,</li> <li>GATEWAY,</li> <li>Network Printer</li> <li>WIRELESS NETWORK DEVICES</li> <li>Wireless switch,</li> <li>Wireless router,</li> <li>ACCESSPOINT</li> <li>Packets &amp;Protocols</li> </ul>			Different Frequency Ranges
<ul> <li>Multiplexing Types</li> <li>FDM,</li> <li>TDM,</li> <li>COM,</li> <li>WDM</li> <li>Switching Tech.</li> <li>Circuit Switching,</li> <li>Packet Switching,</li> <li>Packet Switching</li> <li>CABLE NETWORK DEVICES</li> <li>LAYER1 DEVICES</li> <li>LAYER1 DEVICES</li> <li>LAN CARD,</li> <li>MODEM,</li> <li>DSL &amp; ADSL</li> <li>HUB(Active, Passive, Smart hub), REPEATER</li> <li>LAYER2 DEVICES</li> <li>SWITCH(Manageable, non- manageable)</li> <li>BRIDGE(Source route, Transactional)</li> <li>LAYER3 DEVICES</li> <li>ROUTER,</li> <li>LAYER3 SWITCH</li> <li>BROUTER,</li> <li>GATEWAY,</li> <li>Network Printer</li> <li>WIRELESS NETWORK DEVICES</li> <li>Wireless switch,</li> <li>Wireless router,</li> <li>ACCESSPOINT</li> <li>Packets &amp;Protocols</li> </ul>			Multiplexing & De-multiplexing
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ACCESSPOINT     Packets & Protocols			<ul> <li>Wireless router,</li> </ul>
Packets & Protocols			ACCESSPOINT
			Packets & Protocols
Conn. Oriented protocols –I CP & connection less			Conn. Oriented protocols –TCP & connection less
Protocols - UDP			Protocols - UDP
TCP/IP STACK, HTTP, FTP, SMTP, POP3, SNMP,			• TCP/IP STACK, HTTP, FTP, SMTP, POP3, SNMP,
TELNET, ARP, RARP, IPX/SPX, AppleTalk,			IELNET, ARP, RARP, IPX/SPX, AppleTalk,
NetBIOS Name PROTOCOL		Network Protocols and IP Addressing	NetBIOS Name PROTOCOL
3 Protocols and L2CAP, RFCUIVIM Protocol	3		L2CAP, KFCUIVINI Protocol
IP Addressing			vvnat is ip address?     Types of ip address?
• Types of tp address			• Types of Ip address
<ul> <li>IPV4</li> <li>Class structure, subpoting, super potting</li> </ul>			<ul> <li>Ipv4</li> <li>Class structure, subnating, super patting</li> </ul>
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<ul> <li>Basic structure of inv6</li> </ul>			$\sim$ Basic structure of inve



# B.Sc.(I.T.) (Honours) & B.Sc.(I.T.) (Honours with Research) (Semester - 3 and Semester - 4) Saurashtra University To be effective from June – 2024

	<ul><li>Implementation of ipv6</li><li>Migration from ipv4 to ipv6</li></ul>
Seminar	- 5 Lectures
Expert Talk	- 5 Lectures
Test	- 5 Lectures

# Total Lectures 30 + 15 = 45

## **Reference Books:**

- Networking Essential Glenn Berg Tech. Media
- MCSE Self-Paced Training Kit (Server 2003) Data Communication and Networking B A Forouzan
- Networking Essential Glenn Berg Tech. Media
- MCSE Self-Paced Training Kit (Server 2003)
- Data Communication and Networking B A Forouzan

#### **Course outcomes:**

- Understand various types of computer networks
- Enumerate the layers of the OSI model and TCP/IP
- Understand principles of LAN design such as topology and configuration
- Apply transmission media and various networking devices to establish networks
- Compare and Analyze various spread spectrum and multiplexing techniques
- Understand network industry trends such as: Routing Protocols, IP Addresses, Error Detection