



Source: <https://snabaynetworking.com/what-is-computer-network-and-its-types/>

22CS204 COMPUTER NETWORKS

Hours Per Week :

L	T	P	C
2	0	2	3

PREREQUISITE KNOWLEDGE: JAVA programming and UNIX commands.

COURSE DESCRIPTION AND OBJECTIVES:

This course focuses on imparting knowledge about various protocols involved in LANs and WANs. In addition, it gives a good foundation on different protocols such as data link protocols, internet protocols, and transport protocols present in the respective layers of the data communication system.

MODULE-1

UNIT-1

8L+0T+8P=16 Hours

INTRODUCTION TO COMPUTER NETWORKS AND INTERNET

Understanding of network and Internet, the network edge, the network core, Understanding of Delay, Loss and Throughput in the packet switching network, protocols layers and their service model, History of the computer network.

UNIT-2

8L+0T+8P=16 Hours

APPLICATION LAYER & TRANSPORT LAYER

Principles of computer applications, Web and HTTP, E-mail, DNS, Socket programming with TCP and UDP.

Introduction and transport layer services, Multiplexing and Demultiplexing, Connectionless transport (UDP), Principles of reliable data transfer by considering Privacy, Security accessibility and Transparency, Connection-oriented transport (TCP), Congestion control.

PRACTICES:

- Install Network Simulator 2/3. Create a wired network using dumbbell topology. Attach agents, generate both FTP and CBR traffic, and transmit the traffic. Vary the data rates and evaluate the performance using metric throughput, delay, jitter and packet loss.
- Create a static wireless network. Attach agents, generate both FTP and CBR traffic, and transmit the traffic. Vary the data rates and evaluate the performance using metric throughput, delay, jitter and packet loss.
- Create a mobile wireless network. Attach agents, generate both FTP and CBR traffic, and transmit the traffic. Vary the data rates and evaluate the performance using metric throughput, delay, jitter and packet loss.
- Implementation of one-way and two-way communication using TCP / UDP.
- Hello command is used to know whether the machine at the other end is working or not. Echo command is used to measure the round trip time to the neighbour. Implement Hello and Echo commands using JAVA.

MODULE-2

UNIT-1

8L+0T+8P = 16 Hours

NETWORK LAYER

Introduction to forwarding and routing, Network Service models, Network Congestions, Interoperability, security and intrusion detection, Virtual and Datagram networks, study of router, IP protocol and

addressing in the Internet, Routing algorithms, Broadcast and Multicast routing.

UNIT-2

8L+0T+8P=16 Hours

THE LINK LAYER AND LOCAL AREA NETWORKS

Introduction to link layer services, error detection, and correction techniques, Multiple access protocols, addressing, MAC address Spoofing and Security, Ethernet, switches, and VLANs and LAN Security Policies.

PRACTICES:

- Find all the IP addresses on your network using Unicast, Multicast, and Broadcast on your network.
- Use Packet tracer software to build network topology and configure using Distance vector routing and Link State routing protocols.
- Study different types of Network cables (Copper and Fiber) and prepare cables (Straight and Cross) to connect two or more systems.
 - a. Use a crimping tool to connect jacks.
 - b. Use a LAN tester to connect the cables.
 - c. Install and configure Network Devices: HUB, Switch and Routers (Consider both manageable and non-manageable switches. Perform logical configuration of the system and set the bandwidth of different ports).
 - d. Install and Configure Wired and Wireless NIC and transfer files between systems in Wired LAN and Wireless LAN. Consider both ad-hoc and infrastructure modes of operation.
- Apply the commands such as Ping, Tracert, Ipconfig, pathping, telnet, FTP, getmac, ARP, Hostname, Nbtstat, netdiag, and Nslookup to solve various problems.

COURSE OUTCOMES:

Upon successful completion of this course, students will have the ability to:

CO No.	Course Outcomes	Blooms Level	Module No.	Mapping with POs
1	Build the basic concepts of Network hardware, software and reference models.	Apply	1	1, 2, 12
2	Evaluate different physical layer media and switching methods.	Evaluation	1	1, 2, 5, 12
3	Implement various protocols with modern tools.	Apply	1	1, 2, 3, 5, 12
4	Apply different protocols to perform end-to-end delivery and interaction with users.	Analyze	2	1, 2, 12
5	Analyze various design issues, protocols and functionalities of network layer.	Analyze	2	1, 2, 12
6	Demonstrate various protocols involved in data link layer operations.	Apply	2	1,2, 5

TEXT BOOKS:

1. Kurose and Ross, "Computer Networking- A Top-Down approach", 6th Edition, Pearson, 2017.
2. Behrouz Forouzan, "Computer Networks- A Top-Down approach", McGraw Hill, 2014.

REFERENCE BOOKS:

1. Andrew S. Tanenbaum, "Computer Networks", 5th edition. Pearson Education, 2014.
2. Behrouz A. Forouzan, "Data communications and Networking", 5th edition, TMH, 2017.
3. William Stallings, "Data and Computer Communications", 10th edition, Pearson Education, 2017.

SKILLS:

- ✓ Establish local area networks with different topologies.
- ✓ Design of new routing protocols.
- ✓ Network troubleshooting such as installing network interface card drivers, setting IP addresses, subnet masking, etc.