

16CS306 COMPUTER NETWORKS

Hours Per Week :

L	T	P	C
3	-	2	4

Total Hours :

L	T	P	WA/RA	SSH/HSB	CS	SA	S	BS
45	-	30	20	48	6	12	3	5



Course Description and Objectives:

This course offers an insight into different LAN and WAN technologies, and various protocols of the layered network architectures that are widely used in network applications. The objective of this course is to enable the student to learn about LAN and WAN technologies, transmission media, reliable communication over a link, packet routing, network congestion, internetworking, Quality of Service (QoS), end to end reliable communication.

Course Outcomes:

The student will be able to:

- understand the basic taxonomy and terminology of computer networks.
- distinguish among different networks.
- understand LAN and WAN technologies.
- understand and analyze the functioning of various protocols.
- develop network applications.

SKILLS:

- ✓ *Implement Local Area Networks with different topologies.*
- ✓ *Simulate various routing protocols.*
- ✓ *Network trouble shooting.*

ACTIVITIES:

- Identify various network devices.
- Investigate various network topologies.
- Connect and Configure workstations in Ethernet and WLAN.
- Simulate data link protocols.
- Detect and correct the errors in data transmission.
- Identify different classes of IP addresses.
- Analyze IP, TCP, UDP, ARP, DNS, HTTP, FTP, Telnet protocols.
- Configure intranet routers.
- Develop network applications.

UNIT - 1**L-9**

INTRODUCTION: Use of computer networks, Network hardware, Network software, Reference models, Example networks.

UNIT - 2**L-9**

PHYSICAL LAYER: Guided transmission media, FDM, TDM, Switching.

DATA LINK LAYER: Design issues, Error detection and correction, Elementary data link protocols, Sliding window protocols.

MEDIUM ACCESS CONTROL SUB LAYER: The channel allocation problem, Multiple access protocol, Ethernet, Wireless LANs, Data link layer switching.

UNIT - 3**L-9**

NETWORK LAYER: Design issues, Routing algorithms, Congestion control algorithms, Quality of service, Internet working, The network layer in the internet-IPv4, IP addresses, IPv6, ICMP, Mobile IP.

UNIT - 4**L-9**

TRANSPORT LAYER: The transport service, Elements of transport protocols, The internet transport protocols-UDP and TCP.

UNIT - 5**L-9**

APPLICATION LAYER: DNS-Domain name system, E-mail, The World Wide Web, Streaming audio and video, Content delivery networks.

LABORATORY EXPERIMENTS**Course Outcomes:**

The student will be able to:

- ✓ understand the structure and organization of computer networks; including the division into network layers, role of each layer, and relationships between the layers.
- ✓ understand the basic concepts of application layer protocol design; including client/server models, peer to peer models, and network naming.
- ✓ in depth understanding of transport layer concepts and protocol design; including connection oriented and connection-less models, techniques to provide reliable data delivery and algorithms for congestion control and flow control.

LIST OF EXPERIMENTS

Total Hours-30

1. Implementation of:

- a. Data Link Framing method - Character Count, Bit stuffing and Destuffing.
- b. Error detection method - even and odd parity and CRC Polynomials.
- c. Data Link protocol - Unrestricted simplex protocol.
- d. Data Link protocol - Stop and Wait protocol.
- e. Routing algorithm - Dijkstra's algorithm.

2. Study of Network IP Addressing.
3. Study of TCP/UDP sockets in detail.
4. Design of client server application for file transfer.

TEXT BOOK:

1. Andrew S Tanenbaum, "Computer Networks", 5th edition, Pearson Education/Prentice Hall, 2011.

REFERENCE BOOKS:

1. Behrouz A. Forouzan, "Data communications and Networking", 3rd edition, TataMcGraw Hill, 2003.
2. William Stallings, "High Speed Networks and Internets", 2nd edition, Pearson Education/Prentice Hall, 2002.
3. William Stallings, "Data and Computer Communications", 7th edition, Pearson Education/Prentice Hall, 2004.
4. S.Kesav, "An Engineering approach to Computer Networking", 1st edition, Pearson Education/Prentice Hall, 1997.