

16CS306 COMPUTER NETWORKS

Hours Per Week :

L	T	P	C
3	-	2	4



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:

Upon successful completion of this course, students should be able to:

- CO1: Understand the basic concepts of Network hardware, software and reference models.
- CO2: Learn different physical layer media and switching methods.
- CO3: Identify various protocols involved in data link layer operations.
- CO4: Analyze various design issues, protocols and functionalities of network layer.
- CO5: Apply different protocols to perform end-to-end delivery and interaction with users.
- CO6: Implement various protocols with modern tools.

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**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.