19CS304 COMPUTER NETWORKS

Hours Per Week :

L	T	P	C
3	0	2	4

Total Hours :

L	T	P
45	-	30

CS	WA/RA	SSH	SA	S	BS
5	5	30	20	5	5

PREREQUISITE COURSES: Data Structures, Operating Systems.

COURSE DESCRIPTION AND OBJECTIVES:

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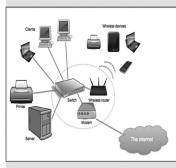
COURSE OUTCOMES:

Upon completion of the course, the student will be able to achieve the following outcomes:

COs	Course Outcomes	POs
1	Apply the routing algorithms for given network scenario.	1
2	Analyse the best fitting logical addressing requirements from the organization.	2
3	Evaluate the protocols for given network scenario.	4
4	Design client server apps on TCP/IP suite.	3, 10
5	Analysis of different protocol packets using modern toos NS2, NS3, packet analyzer and wireshark etc.	4,5,10

SKILLS:

✓ *Establish local area networks with different topologies.*

✓ *Design of new routing protocols.*

✓ *Network trouble shooting such as installing network interface card drivers, setting IP addresses, and subnet masking etc.*

UNIT– I   **L- 9**

INTRODUCTION: Uses of computer networks; Network hardware; Network software; Reference models; Example networks.

Physical Layer: Guided transmission media; Frequency division multiplexing; Time division multiplexing; Code division multiplexing; Switching.

UNIT – II   **L- 9**

DATA LINK LAYER: Data link layer design issues; Error detection and correction; Elementary data link protocols; Sliding window protocols; Example data link protocols.

Medium Access Control Sub Layer: The channel allocation problem; Multiple access protocols.

UNIT – III   **L- 9**

NETWORK LAYER: Network layer design issues; Routing algorithms - optimality principle, shortest path routing, flooding, distance vector routing, link state routing and hierarchical routing; Congestion control algorithms; QoS improving techniques - leaky bucket and token bucket algorithms; Internetworking; The network layer in the internet - IP addresses, IPv4, IPv6, internet control protocols - IMCP, ARP, DHCP and mobile IP.

UNIT – IV   **L- 9**

TRANSPORT LAYER: Services provided to the upper layers; Elements of transport protocols; The internet transport protocols - UDP and TCP.

UNIT – V   **L- 9**

APPLICATION LAYER: Domain name system; E-mail; The world wide web.

LABORATORY EXPERIMENTS

LIST OF EXPERIMENTS   **TOTAL HOURS: 30**

1. Study of Network devices in detail.

2. Implementation of Data Link Framing methods such as Character Count and Bit Stuffing.

3. Implementation of Error detection methods such as Even, Odd parity and CRC Polynomials.

4. Implementation of Data Link protocols includes Unrestricted simplex protocol, A simplex Stop and Wait protocol.

5. Implementation of Dijkstra's routing algorithm.

6. Implementation of one way and two way communication using TCP.

7. Implementation of one way and two way message transfer using UDP.

TEXT BOOK:

1. Andrew S.Tanenbaum, "Computer Networks", 5th edition. Pearson Education, 2014.

REFERENCE BOOKS:

1. Behrouz A. Forouzan, "Data communications and Networking", 4th edition, TMH, 2017.

2. William Stallings, "Data and Computer Communications", 10th edition, Pearson Education, 2017.