ECPC3005 COMPUTER NETWORKS (3-0-0)

Course Learning Objectives:

CLO1 Fundamentals of data communication networks.
CLO2 Software and hardware interfaces
CLO3 Application of various physical components and protocols
CLO4 Communication challenges and remedies in the networks.

Module-I (8Hours)

Introduction to Networks: Network hardware, Network software, OSI, TCP/IP Reference models, Example Networks: ARPANET, Internet.
Physical Layer: Data and signals: analog and digital, periodic analog signals, digital signals, transmission impairments, data rate limit, Guided transmission media twisted pairs, coaxial cable, fiber optics, Wireless transmission, unguided transmission media.

Module–II (8 hours)

Data Link Layer: Design issues, framing, Error detection and correction, CRC codes
Elementary data link protocols: simplex protocol, A simplex stop and wait protocol for an error-free channel, A simplex stop and wait protocol for noisy channel.
Sliding Window protocols: A one-bit sliding window protocol, A protocol using Go-Back-N, A protocol using Selective Repeat, Example data link protocols.
Medium Access sub layer: The channel allocation problem, Multiple access protocols: ALOHA, Carrier sense multiple access protocols, collision free protocols. Wireless LANs, Data link layer switching.

Module–III (8 Hours)

Connecting devices: Learning bridges, spanning tree bridges, repeaters, hubs, bridges, switches, routers and gateways, definition of multiplexing and types.
Network Layer: Design issues, Routing algorithms: shortest path routing, Flooding, Hierarchical routing, Broadcast, Multicast, distance vector routing, link state protocols, path vector routing, Congestion Control Algorithms, Quality of Service

Module–IV (10 Hours)

Internetworking: logical addressing, internet protocols, IP address, CIDR, IPv4 addressing, IPv6 Protocol addressing, addresses mapping, ICMP, IGMP, ARP, RARP, DHCP.
Transport Protocols: process to process delivery, UDP, TCP, TCP Service Model, TCP Sliding Window, TCP Congestion Control, congestion control and quality of service.

Module-V (6 Hours)

Application Layer- Introduction, providing services, Client server model, Standard client-server application-HTTP, FTP, electronic mail, TELNET, DNS.

Course Outcomes:

At the end of the course the student will be able to:
CO1 Learn the basic needs of communication system.
CO2 Interpret the communication challenges and its solution.
CO3 Identify and organize the communication system network components CO 4. Design communication networks for user requirements.

TEXT BOOKS:

1. A. S. Tanenbaum (2003), Computer Networks, 4th edition, Pearson Education/ PHI, New Delhi, India.2
2. Behrouz A. Forouzan (2006), Data communication and Networking, 4th Edition, Mc Graw-Hill, India.

REFERENCE BOOKS:

1. James F. Kurose, K. W. Ross, "Computer Networking: A Top-Down Approach Featuring the Internet", Pearson Education.
2. An Engineering Approach to Computer Networks-S. Keshav, 2nd Edition, Pearson Education

Weblinks and Video Lectures (e-Resources):

https://nptel.ac.in/courses/106105183
https://nptel.ac.in/courses/106105081