

## CSPC2007 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>