**Unit: 1** [10%]

**Introduction:** Uses of computer network, Network hardware – LAN, MAN, WAN. Network software – protocol hierarchies, Design issues for layers, Connection oriented and connectionless services, OSI model, TCP/IP model, and Comparison of OSI and TCP/IP model.

**Unit: 2** [15%]

**Physical layer:** Guided Media - Twisted Pair, coaxial cable, Fiber optics. Unguided transmission media - Radio wave, micro wave and infrared, Multiplexing – FDM, TDM, WDM. Switching – Circuit switching, Message Switching, Packet switching.

**Unit: 3** [15%]

**The Data Link Layer:** Design Issues - Framing, Error control, Flow control, Error detection and correction. Elementary data link protocols - Simplex, stop and wait, sliding window protocol - Go Back N, Selective repeat. Example of Data link protocol: HDLC.

**Unit: 4** [15%]

**The Medium Access Control Sublayer:** The channel allocation problem, Multiple Access protocols - ALOHA, CSMA protocols. Wireless LAN protocols – MACA, MACAW. Ethernet - Traditional Ethernet, Switched Ethernet, Fast Ethernet, Gigabit Ethernet. Data link layer switching - Transparent Bridges, source routing Bridge, Remote Bridges, Repeaters, Hub, Switches , Routers, Gateway.

**Unit: 5** [25%]

**The Network Layer:** Design Issues - Store and forward packet switching, Service provided to transport layer, Implementation of connection oriented and connection less service, Comparison of virtual circuit and datagram subnets, Routing algorithms - The Optimality principle, Shortest path routing, Flooding, Distance vector routing, Link state routing, Hierarchical routing, Broadcast routing, Multicast routing. Congestion control algorithms principles, Prevention policies, Congestion control in virtual circuit subnets, Congestion control in datagram subnets, Load shedding, Jitter control. Quality of service - Requirements, techniques for achieving good quality of service. The network layer in the internet - The IP protocol, IP addresses.

**Unit: 6** [15%]

**The Transport Layer:** The transport service - Services provided to the upper layers, Transport service primitives, Elements of transport protocol - addressing, Connection establishment, Connection release, Flow control, Multiplexing, Crash recovery.

**Unit: 7** [05%]

**The Application layer:** Electronic mail - overview. World Wide Web: Architectural overview, HTTP - overview.

**Text Books :-**
1. Computer network, Andrew S. Tanenbaum, fourth edition, Pearson.
2. Data communication and networking, Behrouz Forouzan, fourth edition, TMH.

**Reference  Book : -**
1. Computer Network, Natalia Olifer, Victor Olifer, Wiley-India edition.
   Data and computer communication, William Stallings, Pearson