CS302 Computer Communications Network

Prerequisites: CS 102, CS201, CS202.

Course Contents:

Introduction **(5%)**
Uses of computer networks. Types of computer networks and network topologies . Layered protocols and OSI reference model. Interfaces and services, Connection oriented and connectionless services. Service primitives, Relationship of services to protocols. TCP/IP reference models.

Physical Layer Fundamentals of communication theory: **(15%)**
Impairment to Transmission, Bandwidth limited signals, Channel speed and bit rate, Maximum data rate over noiseless and noisy channel, Baud rate and Bit rate, Shift keying - FSK, PSK, ASK. QAM. Pulse code modulation, Digital signal encoding, Multiplexing data channels :FDMA,TDMA and CDMA. Guided Transmission Media, Wireless Transmission. Synchronous, Asynchronous and Isochronous transmission. Packet, Message and Circuit switching. Telecommunication Network and Telecommunication Data Hierarchies. Examples: Modem, DSL.

Data Link Layer **(15%)**
Framing, Error control and Flow control, Error detection and correction. Hamming code and Cyclic Redundancy Check., Sliding Window protocols: Go back n and Selective Reject. HDLC: HDLC Options, Frame format and transmission process.

Medium Access Control Sublayer **(15%)**
IEEE LAN standards. ALOHA, CSMA/CD, CSMA/CA. IEEE 802.3 protocol: Switched Fast & Gigabit Ethernet. Wireless Network: IEEE 802.11, IEEE 802.16, Bluetooth. Repeaters, Switches and Bridges. Transparent (Spanning tree) and Source routing Bridges. LLC protocol – IEEE 802.2.

Network Layer **(20%)**
Virtual Circuit vs. Datagram Subnet. Store and Forward mechanism. Routing Algorithms: Optimality Principle, Shortest Path Routing, Unicast Routing: Distance Vector Routing, Link State Routing. Broadcast Routing: Flooding, Reverse path forwarding. Congestion Control. Providing Quality of Service (QOS).

Transport Layer **(10 %)**

Transport Layer Service Primitives. Connection Establishment and Connection release Management. Problem of old duplicates. Flow control and buffering.

TCP/IP protocol Suite **(15%)**

TCP/IP and Internetworking, Ports and sockets, IP address structure, Major features of IP, IP Datagram format, Major IP services and options, Subnets and Classless InterDomain routing.TCP: Major features of TCP, Passive and active open, TCP segment format, Flow and Congestion control. UDP. ARP and RARP.

Upper layer Protocols **(5%)**

Client Server paradigm, Domain name service.

Main Reading

1. Andrew S. Tanenbaum., "Computer Networks", (5th Edition) Prentice Hall of India.

Supplementary Reading

1. Stalling W., " Data and Computer Communication" (8th edition) Prentice Hall of India.
2. Behrouz A Forouzan, "Data Communication and Networking", (4rd edition), Tata McGraw Hill. 3.Behrouz A Forouzan, "TCP/IP Protocol Suite", (3rd edition), Tata McGraw Hill.