

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. SEMESTER: V

INFORMATION TECHNOLOGY/COMPUTER SCIENCE & ENGINEERING/COMPUTER ENGINEERING

Subject Name: **Computer Network**

Subject Code: **150702**

Teaching Scheme				Evaluation Scheme		
Theory	Tutorial	Practical	Total	University Exam (Theory) (E)	Mid Sem Exam (Theory) (M)	Practical (I)
4	0	2	6	70	30	50

Sr. No.	Course content
1.	Introduction : Uses of computer network, Network hardware, Network software, OSI model, TCP/IP model, Comparison of OSI and TCP/IP model, Example network: The internet, X.25, Frame Relay, ATM, Ethernet, Wireless LANs: 802.11.
2.	The Physical Layer: Bandwidth, Maximum data rate of a signal, Guided and unguided transmission media.
3.	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, HDLC.
4.	The Medium Access Control Sublayer: The channel allocation problem, Multiple Access protocols: ALOHA, CSMA, Collision Free Protocols, Limited Contention Protocols, Wavelength Division Multiple Access Protocols, Wireless LAN protocols; Ethernet: Traditional Ethernet, Switched Ethernet, Fast Ethernet, Gigabit Ethernet, IEEE 802.2: LLC Data link layer switching : Bridges, local Internetworking, Spanning tree bridges, Remote Bridge, Repeaters, Hub, Switches, routers, Gateway, Virtual LANs.
5.	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, Optimality principle, Shortest path routing, Flooding, Distance vector routing, Link state routing, Hierarchical routing, Broadcast routing, Multicast routing, Routing for mobile host, Routing in ad-hoc network, 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 Internetworking.

	How network can be connected, Concatenated virtual circuit, Connectionless internetworking, Tunneling, Internetwork routing and fragmentation, The network layer in the internet: The IP protocol, IP addresses, Internet control protocol, OSPF, BGP, Internet multicasting, Mobile IP, IPv6.
6.	The Transport Layer: The transport service: Services provided to the upper layers, Transport service primitives, Socket, Elements of transport protocols: Addressing, Connection establishment, Connection release, Flow control, Multiplexing, Crash recovery. The transport protocol: UDP, TCP.
7.	The Application Layer: DNS: The DNS name space, Resource records, Name servers, Electronic mail: Architecture and services, User agent, Message formats, Message transfer, Final delivery, World Wide Web: Architectural overview, HTTP.

Reference Books:

1. Computer network, Andrew S. Tanenbaum, Pearson.
2. Introduction to Data Communication and Networking, Behrouz Forouzan, TMH.
3. Computer Network, Natalia Olifer, Victor Olifer, Wiley-India edition.
4. Data and computer communication, William Stallings, Pearson.