**Course Content**

**Unit I: DATA COMMUNICATION 04 lecture hours**

Introduction, Theoretical Model for Communication, Bandwidth, throughput, Analog and Digital Data Transmission, Transmission Impairments-Guided transmission media- Wireless Transmission- Line-of-sight Transmission, data rate Channel Capacity-Band width and Shannon’s capacity equation, Digital Data Communication Techniques: Asynchronous and Synchronous Transmission, Concept of circuit, Message, Packet Switching with their timing diagram, Comparison of Switching Techniques.

**Unit II: PHYSICAL LAYER 05 lecture hours**

Evolution of computer network, Layered Network Architecture, OSI Layer Model, TCP/IP, ATM, three tier architecture, System Network architecture, Protocols & Standardization, Transmission media, Topology, Line Discipline , ISDN, Frame relay, Ethernet switches, Fast Ethernet and Gigabit Ethernet, FDDI.

**Unit III: DATA LINK LAYER 06 lecture hours**

Data link layer services: Error detect and correction techniques, Elementary Data link layer protocols, sliding window protocols, stop and wait protocol, selective repeat, HDLC ,Multiple access protocols, TDM, FDM, CDMA Random access protocols: ALOHA, CSMA,CSMA/CD,CSMA/CA. IEEE 802 standards for LAN & WAN: 802.3, 802.4, 802.5, 802.6, 802.2 & their comparison,

**Unit IV: NETWORK LAYER 03 lecture hours**

Network layer Services, Datagram and Virtual circuit services, IP datagram format and Types of Services, Datagram encapsulation and Fragmentation, Reassembly and fragmentation. Ip addressing, subnetting and supernetting.

**Unit V: ROUTING TECHNIQUES 07 lecture hours**

Routing: Link state routing, distant vector routing, hierarchical routing, multicast routing. Internet Routing Between Peers (BGP)-Routing Within An Autonomous System (RIP, OSPF). IPv4, IPv6: Frame formats-Comparison with IPv4. Introduction to ICMP, DHCP and NAT. Network Management: SNMP and RMON models

**Unit VI: TRANSPORT LAYER AND APPLICATION LAYER 09 lecture hours**

Transport Layer Services, Relationship with Network Layer, Relationship with Application Layer, Multiplexing and De multiplexing, UDP, TCP: Header ,Segment Structure, Services, Connection establishment and termination, Flow control and window size advertising, TCP time out and re-transmission, Congestion Control, TCP Fairness, Delay Modeling. Application layer protocols:-WWW and HTTP, FTP, DNS, SMTP, SNMP, RPC, P2P File sharing, Domain Name system (DNS)

**Text Books**

1. Youlu Zheng and Shakil Akhtar, Networks for Computer Scientist and Engineers, Oxford
2. University Press,2006
3. Behrouz A. Fourouzan ,Data Communications and Networking, 2/e Tat McGrawhill,2000
4. James F. Kurose and Keith W. Ross, Computer Networking – A Top-Down Approach
5. Featuring the Internet,2/e Pearson Education ,2003

**Reference Books**

1. S. Keshav, An Engineering Approach to Computer Networking, Pearson education ,2002
2. F. Halsall, Data Communication, Computer Networks and Open Systems, Addison Wesley, 1996
3. Andrew S. Tanenbaum, Computer Networks , 4/e, Pearson education, 2003
4. Leon-Garcia and I. Widjaja, Communication Networks, Tata McGraw Hill, 2000
5. Bertsekas and Gallagar , Data Networks, 2/e, PHI, 1992
6. Douglas E Comer ,Computer Networks and Internet’s, 2/e Pearson Education,2004
7. Gallo, Computer Communication and Networking Technologies, Thomson Learning