

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 University Press, 2006
2. Behrouz A. Fourouzan, Data Communications and Networking, 2/e Tat McGrawhill, 2000
3. James F. Kurose and Keith W. Ross, Computer Networking – A Top-Down Approach
4. 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