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	DATA COMMUNICATION AND COMPUTER NETWORKS				
Version 1.0		3	0	0	3
Pre-Requisites/Exposure	Basic knowledge of computer systems and data structures				
Co-Requisites	Basic Mathematics				

Course Objectives

To help in understanding the concepts of communications and computer networks.

Course Outcomes

On completion of this course, the students will be able to

CO1. Discuss concepts of data communication and layered model of networks.

CO2. Describe concepts of flow and error control in networks.

CO3: Demonstrate various addressing schemes and routing strategies.

CO4: Describe various functionalities at transport and application layer.

Catalog Description

This course provides an introduction to data communication and computer networks. The course covers the principles of data communication, the fundamentals of signaling, basic transmission concepts, transmission media, circuit control, line sharing techniques, physical and data link layer protocols, error detection and correction, data compression, common carrier services and data networks. Various routing strategies, functions of protocols included in TCP/IP protocol suite, different congestion control mechanisms and the protocols used at application layers (like HTTP, FTP, SNMP, SMTP etc.) have also been included in the course.

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)