CAP275:DATA COMMUNICATION AND NETWORKING

Course Outcomes: Through this course students should be able to

CO1 :: Recognize the basics of data communication, networking, internet and their importance.

CO2 :: Understand the concepts of data communication, layered model, protocols and interworking between computer networks and switching components.

CO3 :: Determine the various networks using the the logical addressing and by applying subnetting and routing concepts.

CO4 :: Analyze the working of transport and application layer protocols in an IP based networking infrastructure.

Unit I

Data communications : characteristics, components, data representation, data flow

Networks : distributed processing, network criteria, types of connections, types of topologies, categories of networks, protocols, standards, standards organizations, internet standards

Network models : the OSI model, layered architecture, layers in the OSI model, TCP/IP protocol suite, addressing mechanisms in layers

Unit II

Physical layer : analog and digital, analog signals, digital signals, analog versus digital, data rate limit, transmission impairments, line coding, block coding, sampling, transmission mode, modulation of digital data, telephone modems, modulation of analog signal, FDM, WDM, TDM, guided media, unguided media, switching, networking devices

Unit III

Data link layer : error detection and correction, types of errors, error detection and correction techniques, data link control and protocols, flow and error control, stop-and-wait ARQ, go-back-n ARQ, selective repeat ARQ, HDLC, point-to-point access, point–to-point protocol (PPP), PPP stack, multiple access, random access, controlled access, channelization

Unit IV

Network layer : classful addressing, logical addressing, IPv4, IPv4 frame format and functions, subnets, FLSM, VLSM, classless inter domain routing (CIDR), public and private addresses, network address translation (NAT), IPv6, basic routing (or forwarding) mechanism, unicast routing protocols, distance vector routing, RIP, link state routing, OSPF, path vector routing, BGP, overview of multicast routing

Unit V

Transport layer : process-to-process delivery, port addresses, socket address, user datagram protocol (UDP), transmission control protocol (TCP), 3-way handshaking, SCTP, data traffic, traffic descriptors, congestion control, quality of service, techniques to improve QoS

Unit VI

Application layer : domain name system (DNS), Dynamic Host Configuration Protocol (DHCP), remote logging, TELNET, electronic mail, file transfer, WWW, HTTP, network management system, simple network management protocol (SNMP)

Network security : cryptography, symmetric key cryptography, public key cryptography, security services, IPSec, VPN, firewalls

Text Books:

1. DATA COMMUNICATIONS AND NETWORKING by BEHROUZ A. FOROUZAN, Mc Graw Hill Education

References:

1. COMPUTER NETWORKS by ANDREW S. TANENBAUM, DAVID J. WETHERALL, PEARSON

2. DATA AND COMPUTER COMMUNICATIONS by WILLIAM STALLING, Pearson Education India