

CSE306:COMPUTER NETWORKS

L:2 T:0 P:2 Credits:3

Course Outcomes: Through this course students should be able to

- CO1 :: define network topologies, models and functionalities of different layers
- CO2 :: explain data communication and error handling in network
- CO3 :: utilize IP addressing in network setup and use of multiple access protocols in network
- CO4 :: examine different routing algorithms and identify IPv4/IPv6 headers and NAT techniques in network
- CO5 :: discuss transport layer protocols and congestion control concepts
- CO6 :: identify application layer protocols and wireless network standards

Unit I

INTRODUCTION : Introduction to Computer Networks, Networks and Types, Network hardware architecture and its topologies and device like HUB, Switch and Routers, Network software architecture and its layers and protocols

NETWORK MODELS : OSI Model, TCP/IP protocol suite

Unit II

PHYSICAL LAYER : Basics for Data Communications, Transmission Media - Guided and Unguided, Transmission Impairments and Performance

DATA LINK LAYER : Elementary Datalink Protocols, Error Detection and Correction- Hamming code, CRC, Parity, Checksum

Unit III

MAC SUBLAYER : Multiple Access Protocols- ALOHA, CSMA and CSMA/CD, Ethernet protocol

NETWORK LAYER: IP Addressing : IP Addressing Both Classfull and Classless, Subnetting examples

Unit IV

NETWORK LAYER: Routing : Routing Algorithm-Shortest path algorithm, Distance vector Routing, Link State routing

NETWORK LAYER: IP Header : IPv4 Header, IPv6 Header, IPv6 Addressing, Network Address Translation (NAT)

Unit V

TRANSPORT LAYER : Relationship between Transport and Network Layer, Transport Layer Services, Performance issues, TCP- Header format and handshaking operation, UDP- Header format

TRANSPORT LAYER: CONGESTION CONTROL : Network assistance Congestion Control Algorithms, TCP Congestion Control

Unit VI

APPLICATION LAYER : Domain Name System, E Mail, FTP

Wireless Networks : Introduction, IEEE 802.11: 802.11a, 802.11b, 802.11g, 802.11n, Bluetooth: Architecture, Layers

List of Practicals / Experiments:

Network hardware and basics of IP addressing concept

- Familiar with the usage of cisco packet tracer
- Basic working of hub, switch and router
- Adding of interfaces (ports) in the devices
- Creation of cross and straight cables
- IP addressing basics
- Implementation and configuration of different topologies such as bus, star, ring, mesh, tree and hybrid

- Configuration of devices using command line interface (CLI)

Network Commands

- ipconfig, ping, tracert, arp, netstat, nslookup, switch commands, router commands (use DOS and scenario based commands)

Network layer routing protocols

- Implementation of static routing using classfull addressing
- Implementation of dynamic routing using classfull addressing by configuring routing information protocol (RIP)
- Implementation of static routing using classless addressing (FLSM and VLSM)
- Implementation of dynamic routing using classless addressing (FLSM and VLSM) by configuring routing information protocol (RIP, RIP version 2 for VLSM)

Server Configuration and LAN Setup

- Implementation of LAN with DHCP configuration
- Implementation of DNS, FTP, HTTP and Email server configuration

IPv6 addressing and routing

- Implementation of IPv6 static routing
- Implementation of IPv6 dynamic routing

Text Books:

1. DATA COMMUNICATIONS AND NETWORKING WITH TCP/IP PROTOCOL SUITE by BEHROUZ A. FOROUZAN, Tata McGraw Hill, India

References:

1. COMPUTER NETWORKS by ANDREW S. TANENBAUM, PEARSON