Course Name : Computer Engineering Group

Course Code : CO/CD/CM/CW

Semester : Fourth

Subject Title : Computer Network

Subject Code : 17429

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	04	03	100	50#	--	25@	175

NOTE:

- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).**

Rationale:

The world in the information era has become network centric. A Computer networks has been growing with rapid technological progress. Computer communication through networking becomes essential part of our life. We can manage many application like Air Line Reservation, Railway Reservation, E-banking, E-Governance, On-Line shopping, E-learning etc. by clicking mouse button from our own place. Because of this, world become the global village. By considering importance of networking towards all aspects of our life, we here introduce basic concept of networks, network classification, network topologies, network devices, Transmission media, Network reference models, concept of TCP/IP.

This knowledge explores the student for understanding current network management technology.

Objectives:

To develop following skills:

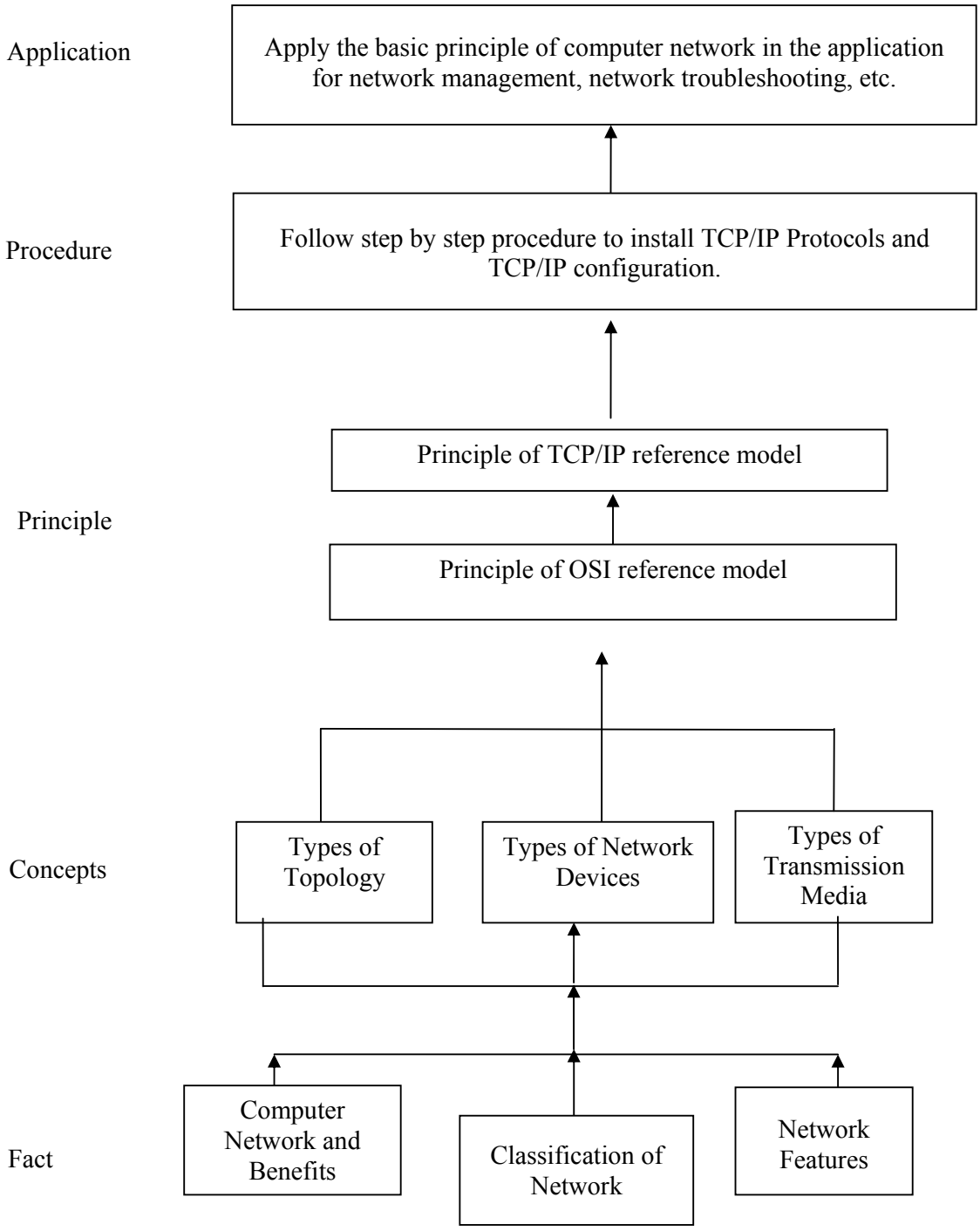
Intellectual Skills:

- Understand network & can identifying benefits of networks.
- Understand and describe communication media.
- Compare different types of Topology.
- Compare different types of network devices.
- Compare OSI and TCP/IP protocol suite.
- Configuration of TCP/IP

Motor Skills:

1. Able to handle Computer Network.
2. To develop a small Computer Network.

Learning Structure:



Contents: Theory

Topic	Content	Hours	Marks
1	**BASIC NETWORK CONCEPTS** **Objectives:-** ➢ Basic Concept of Network. ➢ Classification of Network. ➢ Benefits of Network. 1.1 Fundamentals of Computer Network- Definition Need of Computer Network, Applications, Component of Computer Network. 1.2 Network Benefits- Sharing Information(File Sharing, E-mail) - Sharing Resources (Printer Sharing, Application Services) - Facilitating Centralized Management-Managing Software, Maintaining the Network, Backing up data 1.3 Computer Network Classifications- Classification of Network by their Geography.-PAN, CAN, LAN, MAN, WAN 1.4 Classification of Network by their Component Role--Peer-to-Peer Network, Server-Based Network, Types of server	08	20
2	**NETWORK TOPOLOGIES AND NETWORKING DEVICES** **Objectives:-** ➢ Topology Concepts. ➢ Different types of Topology. ➢ Network Control Devices. 2.1 Network Topologies - Introduction, Definition, Selection Criteria, Types of Topology- i) Bus ii) Ring iii) Star iv) Mesh v) Tree vi) Hybrid. 2.2 Network Control / Connecting Devices - Need of Network Control devices, Role of Network Control devices in a Network, Connectors, Hub, Repeater, Bridges, Switches, Router, Gateway, Modem. 2.3 Network software: NIC Device Driver, client-server software eg. telnet, ftp	10	20
3	**TRANSMISSION MEDIA** **Objectives:-** ➢ Concept of Guided and Unguided Transmission Media. ➢ Types of Guided Media. ➢ Types of Unguided Media. 3.1 Introduction - Need of Transmission Media, Selection Criteria. 3.2 Types of Transmission Media- 1) Guided Media: Cable Characteristics, Types of Cable-Twisted Pair Cable, Co-axial Cable, Fiber Optic Cable. 2) Unguided media: Types of Communication Band-Microwave Communication, Radio wave Communication, Satellite Communication, Infrared Communication. 3.3 Latest Technologies in Wireless Network-Bluetooth Architecture, Wi-Fi, Wi- Max. 3.4 Cellular (Mobile) Telephone - Band in Cellular Telephony, Calls using Mobile Phones, Transmitting receiving / Handoff operations.	10	20

4	**OSI Reference Model** **Objectives:-** ➢ Concept of Reference Model. ➢ OSI Reference Model Concept. ➢ Layers of OSI Reference Model. 4.1 Introduction– Layered Architecture , Peer-to- Peer Processes-Interfaces between Layer, Protocols, Organization of the Layers, Encapsulation. 4.2 Layers of the OSI Reference Model (Functions of each Layer & Protocols used) – Physical Layer, Data-Link Layer, Network Layer, Transport Layer, Session Layer, Presentation Layer, Application Layer.	08	18
5	**TCP / IP SUITE** **Objectives:-** ➢ TCP/ IP Model Concept. ➢ Defining/functioning of different Layers of TCP / IP suite. 5.1 Introduction –Addressing mechanism in the Internet 5.2 IP Addressing – IP Address classes, classless IP addressing, Subnetting, supernetting, Masking, 5.3Layered Structure of the TCP / IP Model – Host-to-Network, Internet, Transport, Application 5.4 TCP / IP Protocol Suite : Host-to-Network-SLIP and PPP, Internet Layer-ARP,RARP and IP: Introduction, IPv4, IPv6 (Header Format), Difference between IPv4 & IPv6. Transport Layer- TCP and UDP (Frame Format,port addresses), Application Layer- FTP, SMTP, DNS. 5.5 Comparision between OSI and TCP / IP Network Model.	12	22
	Total	**48**	**100**

List of Practical:

Sr. No.	Title of Experiment	No. of Hours
1	To observe Components of Network in your Computer Network Lab. (To know your Network Lab.)	04
2	To understand network features	04
3	To connect and understand different Transmission Media and Network Control devices.	04
4	To Prepare a Straight Cable and Network Cross over Cable and test by Line Tester.	04
5	To install a network interface card	04
6	To Connect Computers in Star Topology using Wired Media and any Network control Device.	06
7	To connect two hubs/switch by creating crossover connection	04
8	To Configure Peer-to-Peer Network.	06
9	To Share Printer and Folder in Network.	04
10	To Install TCP/IP Protocols (Version 4 and version 6) and configure advanced features of TCP/IP Protocols.	04

11	Install Wireshark software to capture packet and Configure it to capture Ethernet packet. Verify Ethernet frame structure and its 48 bit address.	06
12	To Run Basic TCP/IP Utilities and Network Commands with all options.(Ping, Ping ::1, ipconfig, Tracert, Netstat, Wireshark, ARP, NBTSTAT.EXE, WINIPCFG.EXE),capture TCP, UDP,IP, ARP, ICMP, Telnet, FTP packets using Wireshark packet sniffer software	06
13	To understand Subnet Masking and create two subnets	04
14	To visit server room and prepare report on 1. Proxy Server 2. Server Configuration 3. Router Configuration 4. Firewall Configuration 5. Network setup details (Topology, Back up, IP range, network software, UPS)	04
	TOTAL	**64**

Learning Resources:
Books:

Sr. No.	Title	Author	Publisher
1	Data Communications and Networks	Achyut S. Godbole	Tata McGraw Hill
2	Data Communications and Networking (Forth Edition)	Behrouz A. Forouzan	Tata McGraw Hill
3	Complete Reference Networking	Craig Zacker	Tata McGraw Hill
4	Computer Networking	Tularam M Bansod	Dreamtech Press
5	Networking + Certification (Second Edition)	Microsoft Press	PHI(Prentice-Hall of India Private Limited)