

5.4 COMPUTER NETWORKS

L	P
3	4

RATIONALE

Global connectivity can be achieved through computer networks. After completing the diploma, student should have basic understanding of networking and its models. This subject will help the student in network setup and troubleshooting. It will further give exposure to the students about wireless networks and cloud computing.

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

CO1: Learn about the basic concepts of networking models.

CO2: Handle different IP address classes.

CO3: Connect various networking devices.

CO4: Troubleshoot networking related issues.

CO5: Describe wireless networks and cloud computing.

DETAILED CONTENTS

UNIT I

NETWORKS BASICS

- Concept of network
- Models of network computing
- Networking models
- Peer-to –peer Network
- Client-Server Network
- LAN, MAN and WAN
- Network Services
- Topologies
- Switching Techniques

NETWORKING MODELS

- OSI model: Definition, Layered Architecture

Functions of various layers

- TCP/IP Model: Definition, Functions of various layers
- Comparison between OSI and TCP/IP model

UNIT II

TCP/IP ADDRESSING

- Concept of physical and logical addressing
- IPV4 addresses – Address space, Notations
- Classful Addressing- Different IP address classes, Classes & Blocks, Net-id & Host-Id, Masks, Address depletion
- Classless Addressing – Address blocks, Masks
- Special IP Addresses
- Subnetting and Supernetting
- Loop back concept
- Network Address Translation
- IPV4 Header
- IPV6 Header
- Comparison between IPV4 and IPV6

UNIT III

NETWORK ARCHITECTURE

Ethernet specification and standardization: 10 Mbps (Traditional Ethernet), 10 Mbps(Fast Ethernet) and 1000 Mbps (Gigabit Ethernet)

NETWORK CONNECTIVITY

- Network connectivity Devices
- NICs
- Hubs, Switches, Routers, Repeaters, Modem, Gateway
- Configuration of Routers & Switches

UNIT IV

NETWORK ADMINISTRATION

- Network Security Principles, Cryptography, using secure protocols

- Trouble Shooting Tools: PING, IPCONFIG, IFCONFIG, NETSTAT, TRACEROUT, Wireshark, Nmap, TCPDUMP, ROUTEPRINT
- DHCP Server
- Workgroup/Domain Networking

UNIT V

INTRODUCTION TO WIRELESS NETWORKS

- Introduction to wireless LAN IEEE 802.11, WiMax and Li-Fi
- Wireless Security
- Introduction to bluetooth - architecture, application
- Comparison between bluetooth and Wifi

CLOUD COMPUTING

- Definition of Cloud Computing and advantages of Cloud Computing.
- Cloud Computing service model- SaaS, PaaS, IaaS.
- Deployment model-Private Cloud, Public Cloud, Hybrid, Community cloud.

PRACTICAL EXERCISES

1. Recognize the physical topology and cabling (coaxial, OFC, UTP, STP) of a network.
2. Recognition and use of various types of connectors RJ-45, RJ-11, BNC and SCST
3. Making of cross cable and straight cable
4. Install and configure a network interface card in a workstation.
5. Identify the IP address of a workstation and the class of the address and configure the IP Address on a workstation
6. Managing user accounts in windows.
7. Sharing of Hardware resources in the network.
8. Use of Netstat and its options.
9. Connectivity troubleshooting using PING, IPCONFIG, IFCONFIG
10. Installation of Network Operating System (NOS)

11. Demonstration of Cloud Computing in Labs or using Online Videos.

RECOMMENDED BOOKS

1. Computer Networks by Tanenbaum, Prentice Hall of India, New Delhi.
2. Data Communications and Networking by Forouzan, (Edition 2nd and 4th), Tata McGraw Hill Education Pvt. Ltd, New Delhi.
3. Data and Computer Communication by William Stallings, Pearson Education, New Delhi.
4. Local Area Networks by Peter Hudson.
5. Network+ Lab manual, - BPB Publications -by Tami Evanson.
6. Networking Essentials – BPB Publications New Delhi
7. Cloud Computing by Raj Kumar.

RECOMMENDED WEBSITES

1. <http://swayam.gov.in>

INSTRUCTIONAL STRATEGY

This is hands on practice based subject and topics taught in the class should be practiced in the Lab regularly for development of required skills among the students. This subject contains five units of equal weightage.