Computer Networks (CMP506)

Yashwantrao Chavan Maharashtra Open University

Course Name : Computer Networks
Course No : CMP506

Course Details :

Unit 1. Introduction to Networks :

- Fundamentals of Computer Network- Definition Need of Computer Network, Applications, Component of Computer Network.
- 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
- Computer Network Classifications- Classification of Network by their Geography.-PAN, CAN, LAN, MAN, WAN
- Classification of Network by their Component Role-- Peer-to-Peer Network, Server-Based Network, Types of server

Unit 2. Network Topologies & Networking Devices :

- Network Topologies - Introduction, Definition, Selection Criteria, Types of Topology- i) Bus ii) Ring iii) Star iv) Mesh v) Tree vi) Hybrid.
- 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.
- Network software: NIC Device Driver, client-server software e.g. DHCP, TELNET, FTP

Unit 3. Transmission Media :

- Need of Transmission Media, Selection Criteria.
- Types of Transmission Media- 1) Guided Media: Cable Characteristics, Types of Cable-Twisted Pair Cable, Co-axial Cable, Fibre Optic Cable. 2) Unguided media: Types of Communication BandMicrowave Communication, Radio wave
- Communication, Satellite and Infrared Communication
- Latest Technologies in Wireless Network-Bluetooth Architecture, Wi-Fi, Wi-Max
- Cellular (Mobile) Telephone – Band in Cellular Telephony, Calls using Mobile Phones, Transmitting receiving / Handoff operations

Unit 4. Network Architecture and Protocols :

- Layered Architecture
- Peer-to- Peer Processes Interfaces between Layer, Organization of the Layers
- Protocols
- Encapsulation.

Unit 5. OSI Reference Mode :

- Layers of the OSI Reference Model
- Physical and Data-Link Layer
- Network and Transport Layer
- Session, Presentation and Application Layer

Unit 6. TCP / IP Suite :

- Introduction –Addressing mechanism in the Internet
- IP Addressing – IP Address classes, classless IP addressing, Subnetting, supernetting, Masking,
- Layered Structure of the TCP / IP Model – Host-toNetwork, Internet, Transport, Application
- 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
- Comparison between OSI and TCP/IP Model

Unit 7. Computer Security :

- Introduction to Computer Security, Need for security,
- Security basics: Confidentiality, Integrity, Availability, Accountability, Non-repudiation.
- Threats to Security: Viruses (its types) and Worms, Intruders, Insiders, Criminal organizations, Terrorists, Information warfare Avenues of attack, Steps in attack
- Security Attacks: Active and Passive attacks (Types of attack)
- Password Management
- Role of people in Security: Do‟s and Don’ts

Unit 8. Cryptography & Network Security :

- Introduction: Cryptography, Cryptanalysis, Cryptology.
- Cryptography Techniques:
  a) Substitution techniques: Caesar‟s cipher, monoalphabetic and polyalphabetic, one-time pad.

b) Transposition techniques – Rail fence technique, simple columnar. Hashing – concept

- Firewalls: Introduction, Why Firewall, features, advantages and disadvantages. Types of Firewall. Virtual Private Network work
- Security topologies: security zones, DMZ, Internet, Intranet, VLAN.
- Intrusion Detection: Intrusion detection systems (IDS), host based IDS, network based IDS