Syllabus ...

1. Introduction to Computer Network (10 Hrs.)

- 1.1 Basics of Computer Network
  - 1.1.1 Definition
  - 1.1.2 Goals
  - 1.1.3 Applications
  - 1.1.4 Network Hardware –Broadcast, Point to Point
  - 1.1.5 Components of Data Communication
- 1.2 Network Topologies
  - 1.2.1 Mesh
  - 1.2.2 Star
  - 1.2.3 Bus
  - 1.2.4 Ring
- 1.3 Types of Networks
  - 1.3.1 LAN, MAN, WAN
  - 1.3.2 Internetwork
  - 1.3.3 Wireless Network
- 1.4 Modes of Communication
  - 1.4.1 Simplex
  - 1.4.2 Half Duplex
  - 1.4.3 Full Duplex
- 1.5 Server Based LANs & Peer-to-Peer LANs
- 1.6 Protocols and Standards
- 1.7 Network Software
  - 1.7.1 Protocol Hierarchies, Layers, Peers, Interfaces
  - 1.7.2 Design Issues of the Layers
  - 1.7.3 Connection Oriented and Connectionless Service

2. Network Models (8 Hrs.)

- 2.1 OSI Reference Model : Functions of each Layer
- 2.2 TCP/IP Reference Model, Comparison of OSI and TCP/IP Reference Model
- 2.3 TCP/IP Protocol Suite
- 2.4 Addressing
  - 2.4.1 Physical Addresses

2.4.2 Logical Addresses

2.4.3 Port Addresses,

2.4.4 Specific Addresses

2.5 IP Addressing

2.5.1 Classfull Addressing

2.5.2 Classless Addressing

3. Transmission Media (8 Hrs.)

3.1 Introduction, Types of Transmission Media

3.2 Guided Media:

3.2.1 Twisted Pair Cable - Physical Structure, Categories, Connectors &Applications

3.2.2 Coaxial Cable – Physical Structure, Standards, Connectors & Applications

3.2.3 Fiber Optic Cable- Physical Structure, Propagation Modes, Connectors & Applications

3.3 Unguided Media:

3.3.1 Electromagnetic Spectrum for Wireless Communication

3.3.2 Propagation Modes Ground, Sky, Line-of-Sight

3.3.3 Wireless Transmission: Radio Waves, Microwaves, Infrared

4. Wired and Wireless LAN (8 Hrs.)

4.1 IEEE Standards

4.2 Standard Ethernet MAC Sublayer, Physical Layer

4.3 Fast Ethernet – Goals, MAC Sublayer, Topology, Implementation

4.4 Gigabit Ethernet – Goals, MAC Sublayer, Topology, Implementation

4.5 Ten-Gigabit Ethernet – Goals, MAC Sublayer, Physical Layer

4.6 Backbone Networks -Bus Backbone, Star Backbone

4.7 Virtual LANs Membership, IEEE standards advantages

4.8 Wireless LAN

4.8.1 IEEE 802.11 Architecture

4.8.2 Bluetooth Architecture (Piconet, Scatternet)

5. Network Devices (6 Hrs.)

5.1 Network Connectivity Devices

5.1.1 Active and Passive Hubs

5.1.2 Repeaters

5.1.3 Bridges - Types of Bridges

5.1.4 Switches

5.1.5 Router

5.1.6 Gateways

6. Network Security (8 Hrs.)

6.1 Introduction

6.2 Need for Security

6.3 Security Services

6.3.1 Message - Confidentiality, Integrity, Authentication, Non repudiation.

6.3.2 Entity (User) - Authentication.

6.4 Types of Attack

6.5 Cryptography, PlainText, Cipher Text, Encryption, Decryption, Symmetric Key and Asymmetric Key Cryptography

6.6 Substitution Techniques, Caesar Cipher, and Transposition Cipher (Problems should be covered.)

6.7 Firewalls- Packet Filter firewall, Proxy firewall

6.8 Steganography, Copyright

Contents ...