**Computer Networking**

UNIT-1: INTRODUCTION

1. **Network as an infrastructure for data communication**
2. **Applications of computer network**
3. **Network architecture**
4. **Types of computer networks**
5. **Protocols and standards**
6. **The OSI Reference Model**
7. **The TCP/IP Protocol Suite**
8. **Comparison between OSI and TCP/IP Reference model**
9. **Critiques of OSI and TCP/IP Reference model**

UNIT-2: THE PHYSICAL LAYER

1. **Functions of physical layer**
2. **Data and Signals**
   1. **Analog and digital signals**
   2. **Transmission impairment**
   3. **Data rate limits**
   4. **Performance**
3. **Data transmission media**
   1. **Guided media**
   2. **Unguided media and satellites**
4. **Bandwidth utilization**
   1. **Multiplexing and spreading**
5. **Switching**
   1. **Circuit switching**
   2. **Message switching and packet switching**
6. **Telephone, mobile and cable network for data communication**

UNIT-3: THE DATA LINK LAYER

1. **Functions of data link layer**
2. **Data link control**
   1. **Framing**
   2. **Flow and error control**
3. **Error detection and correction**
4. **High- level data link control(HDLC) & point - to – point protocol(PPP)**
5. **Channel allocation problem**
6. **Multiple Access**
   1. **Random access**
      1. **ALOHA**
      2. **CSMA**
      3. **CSMA/CD**
      4. **CSMA/CA**
   2. **Controlled Access**
      1. **Reservation**
      2. **Polling**
      3. **Token passing**
   3. **Channelization**
      1. **FDMA**
      2. **TDMA**
      3. **CDMA**
7. **Wired LAN**
   1. **Ethernet standards and FDDI**
8. **Wireless LAN**
   1. **IEEE 802.11x and Bluetooth Standards**
9. **Token Bus**
10. **Token ring and Virtual LAN**

UNIT-4: THE NETWORK LAYER

1. **Functions of network layer**
2. **Virtual circuits and datagram subnets**
3. **IPv4 Addresses**
   1. **Address space**
   2. **Notations**
   3. **Classful addressing**
   4. **Classless addressing**
   5. **Subnetting and network address Translation(NAT)**
4. **IPv4 Datagram format and fragmentation**
5. **IPv6 Address Structure and advantages over IPv4**
6. **Routing algorithms**
   1. **Distance vector routing**
   2. **Link state routing**
7. **Internet control protocols**
   1. **ARP**
   2. **RARP**
   3. **ICMP**
8. **Routing protocols**
   1. **OSPF**
   2. **BGP**
   3. **Unicast**
   4. **Multicast and broadcast**

UNIT-5: THE TRANSPORT LAYER

1. **Functions of transport layer**
2. **Elements of transport protocols**
   1. **Addressing**
   2. **Establishing and releasing connection**
   3. **Flow control and buffering**
   4. **Error control**
   5. **Multiplexing and demultiplexing**
   6. **Crash recovery**
3. **User datagram protocol(UDP)**
   1. **User datagram**
   2. **UDP Operations**
   3. **Uses of UDP, RPC**
4. **Principles of reliable data transfer**
   1. **Building a reliable data transfer protocol**
   2. **Pipelined reliable data transfer protocol**
   3. **Go-Back-N(GBN)**
   4. **Selective repeat(SR)**
5. **Transmission control protocol(TCP)**
   1. **TCP services**
   2. **TCP features**
   3. **TCP segment header**
6. **Principle of congestion control**

UNIT-6: THE APPLICATION LAYER

1. **Functions of application layer**
2. **Application layer protocols**
   1. **DNS**
   2. **DHCP**
   3. **WWW**
   4. **HTTP**
   5. **HTTPs**
   6. **TELNET**
   7. **FTP**
   8. **SMTP**
   9. **POP**
   10. **IMAP**
3. **Concept of traffic analyzer**
   1. **MRTG**
   2. **PRTG**
   3. **SNMP**
   4. **Packet tracer**
   5. **Wireshark**

UNIT-7: NETWORK SECURITY

1. **A model for network security**
2. **Principles of cryptography**
   1. **Symmetric key and public key**
3. **Public key algorithm**
   1. **RSA**
4. **Digital signature algorithm**
5. **Communication security**
   1. **IPSec**
   2. **VPN**
   3. **Firewalls**
   4. **Wireless security**