

## COMPUTER NETWORKS

**Credits: 4**

**Semester: IV**

**Subject Code: BS20409**

**No.of Lecture Hours: 60**

### **Objective:**

- To familiarize with fundamental concepts of computer network.
- To gain expertise in various layers of the TCP/IP model.

**Outcomes:** Students will be able to

**CO1: Understand** and identify basic computer network topologies and protocols and explain Data Communication System components.

**CO2: Describe** the functions of each layer in OSI model and its protocols.

**CO3: Classify** different error detecting techniques.

**CO4: Build** skills of sub-netting and routing mechanisms.

**CO5: Classify** the routing protocols and analyze how to assign the IP addresses for the given network.

### **UNIT-I**

#### **Introduction:**

**12 Hrs**

1. Data Communications, Networks, Protocols and Standards  
2
2. OSI Model, Layers in OSI Model, TCP/IP Protocol Suite  
2
3. Analog and Digital, Transmission Impairments  
2
4. Transmission Media-Guided media, Connecting Devices(Hubs, Repeaters, Bridges, Routers-Only Definitions)  
2
5. Digital Transmission-Digital-to-Digital Conversion  
2
6. Multiplexing: Frequency-Division, Wavelength and Time Division  
2

### **UNIT-II**

**12Hrs**

#### **Data Link Layer:**

1. Error Detection and Correction-Parity, Check Sum, CRC, Hamming Code  
3
2. Data Link Control: Framing, Flow and Error Control  
2
3. Stop-and-Wait ARQ, Go-Back-N ARQ, Selective Repeat ARQ, Piggybacking  
2
4. HDLC, Random Access- ALOHA, CSMA, CSMA/CD, CSMA/CA  
3

5. Wired LANs- Ethernet  
2

### UNIT-III

**12 Hrs**

#### Network Layer:

1. IP address Space-Introduction 2
2. Classful and Classless addressing, Subnetting and Supernetting 2
3. IPv4- datagram, Fragmentation, checksum, options 2
4. Internet Control Protocols- ICMP, IGMP, ARP and RARP 3
5. Delivery, Forwarding, Routing protocols -Distance Vector Routing 3

### UNIT-IV

**12 Hrs**

#### Transport Layer:

1. Process-to-Process Delivery, UDP-Well Known Ports, User Datagram, Checksum 3
2. UDP Operation, use of UDP 2
3. TCP- process to process communication, Numbering bytes, TCP services 2
4. Flow control- silly window syndrome, Error Control 2
5. TCP connection, State transition diagram, Congestion control, Timers, Options 3

### UNIT-V

**12Hrs**

#### Application Layer:

1. DNS- Namespace, Domain Name Space, Distribution of Name Space 2
2. DNS in Internet, Resolution, DNS Messages, Types of Records 3
3. TELNET, E-mail Architecture, Message Transfer Agent: SMTP 6
4. Message Access Agent: POP, FTP 1
5. WWW and HTTP- architecture, web documents, HTTP 1