**Data Communication and Networking**

**Course Code: CS44 Credits: 4:0:0**

**Course Contents:**

**Unit 1**

Data Communications, Networks, Network Types, Network Models – Protocol layering, TCP/IP Protocol Suite, The OSI Model, Physical layer: Date Rate Limits, Performance

Digital to Digital Conversion- Line coding: polar, unipolar, Block coding:

4B/5B, Analog to Digital Conversion -Pulse Code Modulation, Digital to

Analog conversion- ASK, FSK, PSK, Analog to Analog conversion –

AM,FM,PM. Multiplexing – FDM, TDM, Spread spectrum- FHSS, DHSS

Switching – Circuit switching, packet switching

**Unit 2**

Error Detection and Correction- Block Coding, Cyclic Codes – CRC,

Polynomials, Cyclic code encoder using Polynomials. Checksum, Forward

Error Correction: chunk interleaving.

Data Link Layer: Data Link Control –DLC services: framing, Data link layer

protocols – stop and wait protocol, Go-Back-N protocol, Selective Repeat

Protocol. HDLC, Point to Point Protocol.

Media Access Control – Random Access- CSMA/CD, CSMA/CA, Controlled access, Channelization

**Unit 3**

Wired LAN - Standard Ethernet, Wireless LANs- IEEE 802.11- Architecture,

MAC sublayer, Addressing mechanism, Connecting Devices

**Network Layer**: IPV4 Addresses: Address space, Classful Addressing,

Classless Addressing, Dynamic Host Configuration Protocol (DHCP), Network Address Translation (NAT).

**Routing Algorithms:** Link-State (LS) Routing Algorithm, The Distance-Vector (DV) Routing Algorithm

**Unit 4**

Routing in the Internet: Intra-AS Routing in the Internet: RIP, Intra-AS Routing in the Internet: OSPF, Inter-AS Routing in the Internet: BGP.

**Transport layer:** Multiplexing and Demultiplexing, Connectionless Transport- UDP: UDP Segment Structure, UDP Checksum, Connection-Oriented Transport-TCP: The TCP Connection, TCP Segment Structure, Round-Trip Time Estimation and Timeout, Reliable Data Transfer, Flow Control, TCP Connection Management, TCP congestion control.

**Unit 5**

**Application Layer:** The Web and HTTP: Overview of HTTP, Non-Persistent and Persistent Connections, HTTP Message Format, User-Server Interaction- Cookies, Web Caching, The Conditional GET. File Transfer- FTP: FTP Commands and Replies, Electronic Mail in the Internet: SMTP, Comparison with HTTP, Mail Access Protocols. DNS—The Internet’s Directory Service: Services Provided by DNS, Overview of How DNS Works, DNS Records and Messages, Peer-to Peer Applications: P2P File Distribution

**Text Books:**

1. Data Communication and Networking, Behrouz A.Forouzan, McGraw

Hill, 5th Edition, 2008.

2. James F. Kurose and Keith W. Ross: Computer Networking: A Top-

Down Approach, 6th edition, Addison-Wesley, 2013.

3. Forouzan: Data Communications and Networking, 5th edition, McGraw

Hill Education 2013.

**Reference Books:**

1. Data and Computer Communication, William Stallings, 8th Edition,

Pearson Education, 2007.

2. Introduction to Data Communications and Networking – Wayne Tomasi,

Pearson Education, 2005.

3. Larry L. Peterson and Bruce S Davie: Computer Networks: A Systems

Approach, Fifth Edition, Elsevier, 2011.

4. Tanenbaum: Computer Networks, 4th Ed, Pearson Education/PHI, 2003.

5. William Stallings: Data and Computer Communications, 8th Edition,

Pearson Education, 2012.