Computer Network (RCP23ACMD504)
Course Contents

Unit-I Introduction to computer network 06 Hrs.

Introduction to computer network, network application, network software and hardware components, Network topology, design issues for the layers. Reference models: Layer details of OSI, TCP/IP models.

Unit-II Physical Layer 05 Hrs.

Introduction to Digital Communication System: Guided Transmission Media: Twisted pair, Coaxial, Fiber optics. Unguided media: Bluetooth. Data Encoding techniques.

Unit-III Data Link Layer 08 Hrs.

DLL Design Issues (Services, Framing, Error Control, Flow Control), Error Detection and Correction (Hamming Code, Parity, CRC, Checksum), Elementary Data Link protocols: Stop and Wait, Sliding Window (Go Back N, Selective Repeat), HDLC Medium Access Control Sublayer: Channel Allocation problem, Multiple Access Protocol (Aloha, Carrier Sense Multiple Access (CSMA/CA, CSMA/CD).

Unit-IV Network Layer 10 Hrs.

Network Layer: Network Layer design issues, Communication Primitives: Unicast, Multicast, Broadcast. IPv4 Addressing (Classfull and Classless), IPv4 Protocol, Network Address Translation (NAT), IPv6.

Routing algorithms: Link state routing, Distance Vector Routing.

Routing Protocols: ARP, RARP, ICMP, IGMP, RIP, OSPF.

Congestion control algorithms: Open loop congestion control, Closed loop congestion control, Token & Leaky bucket algorithms.

Unit-V Transport Layer 06 Hrs.

The Transport Service, Port Addressing, Transport service primitives, Berkeley Sockets, Connection management (Handshake, Teardown), UDP, TCP, TCP Congestion Control: Slow Start.

Unit-VI Application Layer 04 Hrs.

DNS: Name Space, Resource Record and Types of Name Server. HTTP, SMTP, Telnet, FTP, DHCP

Textbooks:

1. A.S. Tanenbaum, "Computer Networks", 6^{th} Edition, Pearson Education, 2020.
2. B.A. Forouzan, "Data Communications and Networking with TCP/IP Protocol Suite", 6^{th}

Edition, TMH, 2022.

3. James F. Kurose, Keith W. Ross, "Computer Networking", A Top-Down Approach Featuring the Internet, 6^{th} Edition, Pearson, 2017.

4. David Hanes, Jerome Henry, Rob Barton, Gonzalo Salgueiro and Patrick Grossetete, "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", 1/e, 2018.

Reference Books:

1. Behrouz A. Forouzan, Firouz Mosharraf, "Computer Networks: A Top-Down Approach", Mc Graw Hill, 2023.

2. Dhanashree K. Toradmalle, "Computer Networks and Network Design", Wiley, 2020.

Web Links:

1. **Web Resources:**
   (a) https://www.netacad.com/courses/networking/networking-essentials
   (b) https://www.coursera.org/learn/computer-networking
   (c) https://www.edx.org/course/introduction-to-networking
2. **Online Courses: NPTEL / Swayam:**
   (a) https://nptel.ac.in/courses/106/105/106105081
   (b) https://nptel.ac.in/courses/106105183
   (c) https://onlinecourses.swayam2.ac.in/cec21_cs04/preview