CA1114A (3L +1T Hrs.)

**DATA COMMUNICATION AND NETWORKING**

**Questions to be set:** 05 (All Compulsory)

**Objectives:** This course highlights the functional evolution and role of data communications. It emphasizes on basic knowledge of computer network and data communication. It also covers the Physical layer and Data Link layer and MAC sub-layer with their respective protocols of the OSI architecture in details. At the completion of this unit students will be able to explain the basic concepts of data communication, design computer programs that are aware of basic aspects of networking and describe emerging networking technologies.

**Pre-requisites:** Basic electronics and Fundamentals of Computers

|  |  |  |  |
| --- | --- | --- | --- |
| **Module** | **Topics to be covered** | **Topics** | **Hrs** |
| Module 1:  Overview, Physical Layer | in  class | Overview: Introduction to Data Communications, Network types. Data Flow, Concepts of Communication in Computer Networks, Layered Architecture, OSI, TCP/IP, Network Addressing. Physical Layer: Data and Signal Fundamentals, Analog and Digital Signals, Transmission Impairments, Transmission Media- Guided and Unguided Guided Media: Twisted Pair, Coaxial, and Fiber Optics Cables, Radio Waves, Microwaves, and Infra-red. | [13] |
| Assignment Topics | To be provided by the concern faculty members | |
| Module 2:  Data Link Layer | in  class | Data Link Layer: Data link layer design Issue, Roles and Responsibilities of Data Link Layer, Error Detection and correction – Single Parity bit, Cyclic Redundancy Check (CRC), Framing, Elementary Data link Protocol: Stop-and-Wait ARQ, Sliding Window, Go-Back-N, Selective Repeat. | [7] |
| Assignment Topics | To be provided by the concern faculty members | |
| Module 3: Switching Techniques, Multiple Access | in  class | Switching Techniques: Circuit-Switched, Packet Switched- Datagram, and Virtual Circuit Networks, Message Switching. Multiple Access: Random Access: Aloha (Pure and Slotted), CSMA, CSMA/CD, CSMA/CA. | [9] |
|  | Assignment Topics | To be provided by the concern faculty members | |
| Module 4: Network layer | in  class | Network layer: Network design issue, Routing algorithm- Introduction, Optimality principle, Shortest path, Flooding, Distance vector routing, Link State Routing. | [6] |
| Assignment Topics | To be provided by the concern faculty members | |
| Module 5: Transport layer | in  class | Transport layer: Transport services, Element of transport protocols, TCP- connection management, transmission policy, congestion control, UDP. | [5] |
| Assignment Topics | To be provided by the concern faculty members | |

**Text Book:**

1. Behrouz A. Forouzan, Data Communications and Networking, Tata McGraw Hill.

2. A. S. Tanenbaum, Computer Networks, Pearson Education Asia.

**Reference Books:**

1. Bharat Bhushan Agarwal, Sumit P. Tayal, Computer Network, University Science Press.

2. William Stallings, Data and Computer Communications, PHI.

3. L. L. Peterson & B.S. Davie, Computer Networks: A System Approach, Elsevier.

4. Alberto Leon-Garcia, Indra Widjaja, Communication Networks, Tata McGraw Hill