

IT202: COMPUTER NETWORK

CREDITS = 6 (L=4, T=0, P=2)

Course Objective: To provide basic knowledge of different types of computer networks, various interfacing standards and protocols.

Teaching and Assessment Scheme:

| Teaching Scheme | | Credits | | Assessment Scheme | | | | Total Marks |
|-----------------|---|---------|---|-------------------|----|-----------|----|-------------|
| L | T | P | C | Theory | | Practical | | |
| | | | | ESE | CE | ESE | CE | |
| 4 | 0 | 2 | 6 | 70 | 30 | 30 | 20 | 150 |

Course Content:

| Unit No. | Topics | Teaching Hours |
|----------|---|----------------|
| 1 | Introduction: Why study data communication?, Data Communication, Networks, Protocols and Standards, Standards Organizations .Line Configuration, Topology, Transmission Modes, Categories of Networks, OSI model, TCP/IP model, Comparison of OSI and TCP/IP model, Example network: The internet, X.25, Frame Relay. | 06 |
| 2 | Physical Layer: Basis for data communication, Digital to digital and Analog to digital conversion, transmission modes, Analog transmission: Digital to analog and analog to analog conversion. Multiplexing and spreading techniques. Switching techniques, types of switching, structure of switch, types of switches. Guided Media and Unguided Media: Radio Frequency Allocation, frequency reuse. | 09 |
| 3 | Data Link Layer: Data link Layer Design Issues, Error Detection & Correction, Types of Errors, Error detection techniques, Error Correction techniques, Multiple-Bit Error Correction, Error control, elementary Data Link Protocols, Sliding Window Protocols, example DLL protocols, Protocols Verification models. | 09 |
| 4 | Medium Access Control Sub Layer: Channel Allocation, Multiple Access Protocols, Ethernet, Data Link Layer Switching : Bridges, local Internetworking, Spanning tree bridges, Remote Bridge, Repeaters, Hub, Switches, routers, Gateway, Virtual LANs. | 07 |
| 5 | Network Layer: Design Issues, Routing Algorithms: Shortest Path Routing, Flooding, Distance Vector Routing, Link State Routing, Broadcast, multicast routing, Congestion Control Algorithms, Quality of Service, Internetworking, Example protocols: OSPF, BGP, Internet multicasting IPv4 and IPv6. | 15 |

| | | |
|---|--|----|
| 6 | Transport Layer: Design Issues, Routing Algorithms: Shortest Path Routing, Flooding, Distance Vector Routing, Link State Routing, Broadcast, multicast routing, Congestion Control Algorithms, Quality of Service, Internetworking, Example protocols: OSPF, BGP, Internet multicasting IPv4 and IPv6. | 08 |
| 7 | Application Layer: DNS: The DNS name space, Resource records, Name servers, Electronic mail: Architecture and services, User agent, Message formats, Message transfer, Final delivery, World Wide Web: Architectural overview, HTTP. | 06 |

List of References:

1. Andrew S. Tanenbaum, *“Computer network”*, Fourth Edition, Pearson.
2. Behrouz Forouzan, *“Introduction to Data Communication and Networking”*, Fourth Edition, Tata McGraw Hill.
3. Natalia Olifer, Victor Olifer, *“Computer Network”*, Wiley-India edition.
4. William Stallings, *“Data and computer communication”*, Eighth Edition, Pearson.

Course Outcomes (COs): At the end of this course students will be able to ...

1. Analyze various protocols and network architectures.
2. Examine the OSI layers in a network.
3. Assess network type and its application.
4. Evaluate key networking algorithms in simulation.
5. Identify the different types of network devices and their functions within a network.
6. Design and configure the network.