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## **20MC110 COMPUTER NETWORKS**

### **Course Description and Objectives:**

This course focuses on imparting knowledge about the aspects of data communication and computer network systems. It also provides essential knowledge about the OSI/ISO reference model and TCP/IP model. In addition, it gives good solid foundation on network communication system layers being the physical, data link, network, transport and application layers.

### **Course Outcomes:**

The student will be able to:

- Analyze the various types of computer communication systems.
- Understand the guided medium of communication.
- Differentiate the services offered by layers in the ISO and TCP/IP models.
- Evaluate the existing routing algorithms and analyze the pros and cons.

### **Skills:**

- Implement local area networks with different topologies.
- Usage of various routing protocols.
- Network trouble shooting such as installing network interface card drivers, setting IP addresses, and subnet masking etc...

### **Activities:**

- Identifying various network devices.
- Investigating several network topologies.
- Simulating data link protocols.
- Identifying different classes of IP addresses.

## **Syllabus**

### **UNIT – 1**

**9 Hours**

TYPES OF NETWORK COMMUNICATION: Uses of computer networks - Business, Home, Mobile users, Social Issues; Network hardware - PAN, LAN, MAN, WAN; Network software - Protocol hierarchies, Design issues, Service primitives.

**UNIT – 2****9 Hours**

REFERENCE MODELS AND PHYSICAL LAYER: OSI, TCP/IP, Comparison, Critique of OSI, Guided Media - Magnetic, Twisted pairs, Coaxial cables, Fiber optics, Fiber cables.

**UNIT – 3****9 Hours**

DATA LINK LAYER: Design issues, Framing, Elementary data link protocols - Simplex, Stop-and-Wait; Sliding-Window protocols - 1 bit, GOBACK-N, Selective repeat.

**UNIT – 4****9 Hours**

NETWORK LAYER: Design issues, Routing Algorithms - Shortest path, flooding, Distance vector; Congestion control Algorithms - 5 approaches.

**UNIT – 5****9 Hours**

TRANSPORT LAYER: Services provided to the upper layers, Transport service primitives, The internet transport protocols UDP - Introduction to UDP; The internet transport protocols TCP - Introduction to TCP, TCP service model, the TCP protocol, The TCP segment header, TCP connection establishment, TCP connection release.

**List of Experiments:**

1. Study of Network devices in detail.
2. Connecting a set of computers in a Local Area Network.
3. Implementation of Data Link Framing method - Character Count.
4. Implementation of Data Link Framing method - Bit Stuffing.
5. Implementation of Error detection method - Even and Odd parity.
6. Setting of Network IP Addresses.
7. Implementation of sample socket programs i.e. TCP and UDP.
8. Working on Network Protocol Analyzer Tool (Ethereal/Wireshark) and write the report on observations with neat screen shots.
9. Working on NMAP Tool for Port scanning and write the report on observations with neat screen shots.

**Text Book:**

Andrew S Tanenbaum, “Computer Networks”, 5<sup>th</sup> Edition. Pearson Education, 2014.

**Reference Books:**

1. Behrouz A. Forouzan, “Data communications and Networking”, 4<sup>th</sup> Edition, TMH, 2017.
2. William Stallings, “Data and Computer Communications”, 10<sup>th</sup> Edition, Pearson Education, 2017.