

## COMPUTER NETWORKS

Subject Code: UGCS5T0218

III Year / I Semester

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### Prerequisites:

Familiarity with Computer Organization and Architecture.

### Course Objectives:

1. To get general idea of data communications, networking, protocols, standards and network reference models
2. To understand the importance of layering and the functionality of various layers
3. To understand how data can be corrupted and how those errors can be detected and corrected
4. To understand how data routing can be done and about various routing protocols

### SYLLABUS:

#### UNIT I:

**8 hrs.**

**Data Communication:** Components, Representation of data and its flow, Networks, Various connection topologies, Protocols and Standards, OSI model, TCP/IP Model.

**Physical Layer:** Guided media (copper, twisted pair, coaxial, fiber optic cable), Unguided media (Electromagnetic spectrum). Data performance, Multiplexing-Frequency division, Time division.

#### UNIT II:

**9 hrs.**

**Data Link Layer:** Framing methods, Error Detection and Error Correction - Fundamentals, Block coding, Hamming code, CRC, Checksum, Flow Control and Error control. Wired LANs, Wireless LANs, Bridge, Switch.

#### UNIT III:

**8 hrs.**

**Medium Access Sub Layer:** Protocols - Stop and Wait, Go back – N ARQ, Selective Repeat ARQ, Sliding Window, Piggybacking, Random Access, Multiple access protocols - Pure ALOHA, Slotted ALOHA, CSMA/CD, CDMA/CA, bridges

#### UNIT IV:

**8 hrs.**

**Network Layer:** Switching, Logical addressing – IPV4, IPV6; Address mapping – ARP, RARP, BOOTP and DHCP-Delivery, ICMP, Routing algorithms - shortest path routing,

Flooding, Hierarchical routing, Broadcast routing, Multicast and distance vector routing, Firewall.

#### **UNIT V:**

**8 hrs.**

**Transport Layer:** Process to Process Communication, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), SCTP Congestion Control; Quality of Service, QoS improving techniques: Leaky Bucket and Token Bucket algorithm.

#### **UNIT VI:**

**9 hrs.**

**Application Layer:** Domain Name Space (DNS), TELNET(Remote Login), EMAIL(SMTP,POP3), File Transfer Protocol (FTP), HTTP.

#### **Course Outcomes:**

Upon the completion of the course, the students will be able to:

- CO 1 Explain the principles of networking protocols and standards; and Identify different concepts of layered architectures in networking.
- CO 2 Identify the design issues and classify the different framing methods and various multiple access protocols.
- CO 3 Compare and contrast the different routing algorithms to analyze the optimum routing path.
- CO 4 Describe the functionality of transport layer and to demonstrate how to control the congestion.
- CO 5 Illustrate some basic tools/utilities for network analysis and employ basic techniques and protocols to connect devices.

#### **Mapping of COs to POs:**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	2	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	3	-	-	-	-	-	-	-	-	-	-
CO3	2	3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	2	3	3	3	-	-	-	-	-	-	-	-	-	-
CO5	2	3	3	3	-	-	-	-	-	-	-	-	-	-

#### **Textbooks:**

1. Computer Networks, 8th Edition, Andrew S. Tanenbaum, Pearson New International Edition.
2. Data Communication and Networking, 4th Edition, Behrouz A. Forouzan, McGraw- Hill.

#### **References:**

1. Data and Computer Communication, 8th Edition, William Stallings, Pearson Prentice Hall India.

2. Internetworking with TCP/IP, Volume 1, 6th Edition Douglas Comer, Prentice Hall of India.
3. TCP/IP Illustrated, Volume 1, W. Richard Stevens, Addison-Wesley, United States of America.