SEMESTER-V

St. Xavier's College (Autonomous), Ahmedabad

Syllabus of Semester – V of the following departments under Faculty of Computer Science based on Undergraduate Curriculum Framework to be implemented from the Academic Year 2025-26.

DEPARTMENT OF COMPUTER SCIENCE

Minor Course – 2: Data Communication and Networking

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course Title & Code	Credit Distribution of The Course			Eligibility Criteria	Pre-Requisite(s) of the Course (if any)
	Lecture	Tutorial	Practical / Practice		
Data Communication and Networking (CSMN552C)	4	0	0	10 + 2 from a recognized board in any stream	Nil

Learning Objective:

The objective of this course is to make students understand the concepts and fundamentals of computer networks, make students familiarize with the basic taxonomy and terminologies of the networking area and gain knowledge on working of various data transmission concepts, layered OSI architectural model and various internetworking devices used to connect various networks.

Learning Outcomes:

The student would be able:

- Describe computer network basics, network architecture, TCP/IP and OSI reference models.
- Identify and understand various techniques and modes of transmission, transmission error detection and correction mechanisms

- Describe data link protocols, multi-channel access protocols and IEEE 802 standards for LAN
- Analyse the elements and protocols of transport layer
- Describe different advanced network technologies and different internetworking devices that can be used to connect different networks.

Unit	Unit Details	Hours
I	**Introduction to Data communications and Networking** ● Introduction ● Fundamental concepts ● Data communications ● Protocols ● Standards ● Signal propagation ● Analog and digital signals ● Bandwidth of a signal and a medium **Analog and Digital transmission** ● Introduction ● Analog signal, Analog transmission ● Digital signal, Digital transmission ● Digital signal, Analog transmission ● Baud rate and bits per second ● •Analog signal, Digital transmission (excluding: Adaptive and Delta modulation) **Modes of data transmission** ● Introduction ● Parallel and Serial communication ● Asynchronous, Synchronous communication ● Simplex, half duplex and full-duplex communication	10
II	**Multiplexing and Demultiplexing** ● Multiplexing and Demultiplexing ● Types of multiplexing o FDM versus TDM o WDM ● Transmission errors: Detection and correction ● Introduction ● Error classification ● Types of Error ● Error Detection (Checksum, VRC, LRC, CRC) ● Recovery from errors	10
III	**Transmission Media** ● Introduction ● Guided media o Twisted pair o Coaxial cable o Optical fiber • **Unguided media** o Microwave o Satellite communication	10

	o Cellular telephones **Network topologies and Switching** • Introduction • Topologies o Mesh o Star o Tree o Ring o Bus o Hybrid • **Basics of switching** • Types of switching o Circuit o Packet o Message	
IV	**Network protocols, OSI, TCP/IP model** Introduction ▪ OSI model and layer functions ▪ TCP/IP ▪ Introduction ▪ TCP/IP basics LAN and WAN ● Introduction ● LAN ● Ethernet o Introduction o Properties of Ethernet o CSMA/CD ● Introduction to VLAN, Fast and Gigabit Ethernet ● Token ring o Basics of Token ring ● FDDI o Introduction o Properties o Operation o Self healing mechanism Introduction ● TCP and UDP ● TCP Basics ● TCP connections ● TCP packet format ● UDP ● UDP packet format ● Difference between TCP and UDP ● Internetworking devices o Repeaters o Bridges o Routers	10

o Gateway

Text Book:

Data Communications and Networks, 2nd Edition Publisher: McGraw Hill By Achyut S Godbole, Atul Kahate

Reference Books:

1. Business data communication Publisher: Cengage publications By Selly Cashman

2. Data communications and networking Publisher: McGraw Hill By Behrouz Forouzan

3. Computer networks Publisher: Pearson By Andrew S. Tanenbaum