

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 – 1 : Basic Statistics using Excel

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course Title & Code	Credit Distribution of The Course			Eligibility Criteria	Prerequisite(s) of the Course (if any)
	Lecture	Tutorial	Practical / Practice		
Basic Statistics Using Excel (CSMN551C)	2		2		Nil

Course Objectives:

Learning Outcomes:

After completing this course, students will be able to:

UNIT	TOPICS / SUBTOPICS	HOURS
1	Data Visualization and Measures of location - Types of data, Levels of data measurement, Classification and Tabulation, Presentation of qualitative and quantitative data, Frequency distribution, Diagrammatic and Graphic presentation of data, Measures of central tendency: Mean, Median, Mode. Practical Sessions: - Introduction to Excel, preparing your data, cleaning and organizing data with Vlookups, Pivot tables, Frequency distribution, Visualizing your data, Excel charts, Excel functions for measures of location.	
2	Measures of Dispersion and Shape Measures of Dispersion (Range, Quartile Deviation, Mean Absolute Deviation and Standard Deviation), Skewness, Kurtosis and their measures. Practical Sessions: Excel functions for measures of dispersion and shape	

3 **Bivariate Data Analysis**

- Bivariate data: Concept of bivariate data, Correlation, Scatter diagram, Types of Correlation, Methods of Measuring Correlation: Karl Pearson's correlation, Spearman's Rank correlation, Principle of Least Squares, fitting of straight lines, Concept of Regression for two variables, Lines of regression, properties of regression coefficient.

Practical Sessions:

- Scatter Plots, Bivariate correlation, fitting of straight lines, Simple linear regression

4 **Basic Time Series Analysis**

- Introduction to Time series data, components of Time series data, Method of measuring trend, Moving Average and Exponential smoothing

Practical Sessions:

- Time series plot, visualizing time series components, trend analysis, Smoothing techniques

Suggestive Readings:

- Dan Remenyi George Onofrei Joe English (2009); An Introduction to Statistics using Microsoft Excel, Academic Publishing Limited
- Agarwal, B. S. (1996): "Basic Statistics", New age International Publishers.
- Bhat, B.R. Srivenkatramana and Rao Madhava K.S.: "Statistics: A beginner's Text", Vol. I, New Age International (P) Ltd.
- Agresthi A.: "An Introduction to Categorical Data Analysis", John Wiley and Sons Inc., N.Y.

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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

10

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

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**