



# GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Bachelor of Science

Level: Under Graduate

Branch Name: Honors/ Honors With Research (Biotechnology)

Course / Subject Code: BS04001061

Course / Subject Name: Data Analysis in Excel

W.e.f. Academic Year:	2025-26
Semester:	4
Category of the Course:	Ability Enhancement Courses

## Prerequisite:

Students should have a foundational understanding of basic mathematics, statistics, and familiarity with spreadsheet software. Prior exposure to data handling concepts will be beneficial for understanding Excel-based data analysis techniques.

## Rationale:

This course is designed to equip undergraduate students with essential data analysis skills using Microsoft Excel. It will provide a strong foundation in data handling, statistical analysis, visualization, and decision-making using Excel functions and tools relevant to various disciplines.

## Course Scheme:

Teaching Scheme			Total Credits	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Practical		
				ESE (E)	PA(M)	ESE (V)	PA (I)	
1	0	2	2	0	50	50	0	100

## Course Content:

No	Content	Hrs
1	Introduction to Excel for Data Analysis: Overview of Excel interface, basic operations, cell referencing, data entry, formatting, and keyboard shortcuts.	3
2	Data Handling and Cleaning: Importing and exporting data, handling missing values, sorting, filtering, data validation, and removing duplicates. Descriptive Statistics using Excel: Measures of central tendency (mean, median, mode), dispersion (variance, standard deviation), and frequency distributions.	3
3	Data Visualization: Creating and formatting charts (bar, pie, line, scatter), conditional formatting, and pivot tables for data summarization.	3



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4	.Advanced Data Analysis: Lookup functions (VLOOKUP, HLOOKUP, XLOOKUP), IF statements, logical functions, regression analysis, trend analysis, and hypothesis testing.	3
5	AI powered Data Analysis: Overview of AI and its role in data analysis Introduction to AI-powered tools in Excel, AI-based data cleaning using "Data Cleaning Wizard", Removing duplicates, handling missing values, and detecting anomalies, Using AI for automatic data classification, AI-driven pattern recognition and insights generation Automating summary statistics with AI, Using the "Forecast Sheet" tool for trend prediction, AI-powered chart suggestions and dynamic visualizations	3

## Reference Books:

1. Wayne Winston, "Microsoft Excel Data Analysis and Business Modeling," Microsoft Press.
2. Bernard Liengme, "A Guide to Microsoft Excel for Business and Statistics," Elsevier.
3. Conrad Carlberg, "Statistical Analysis: Microsoft Excel 2016," Pearson.
4. Debra Dalglish, "Excel Pivot Tables and Data Analysis," Apress.
5. Neil J. Salkind, "Excel Statistics: A Quick Guide," Sage Publications.

## Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
1	Understand and navigate the Excel environment for data analysis.	UN, RM, AN
2	Perform data handling, cleaning, and preprocessing techniques in Excel.	UN, AN
3	Conduct statistical analysis and visualize data effectively.	AN, EL
4	Apply advanced Excel functions for decision-making and predictive analysis.	AN

\*RM: Remember, UN: Understand, AP: Apply, AN: Analyze, EL: Evaluate, CR: Create

## List of Experiments:

Module 1: Introduction to Excel for Data Analysis (4 Hours)

1. Navigating the Excel Interface & Basic Operations – Exploring Ribbon, Toolbars, Sheets, cell formatting, and keyboard shortcuts.
2. Data Entry & Formatting – Entering structured data, conditional formatting, and custom number formats.
3. Working with Large Datasets – Importing CSV/Excel files, data organization, and using Freeze Panes & Split View.



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## Module 2: Data Handling and Cleaning (6 Hours)

4. Data Import and Export – Importing/exporting data from CSV, Web, and Text files.
5. Data Cleaning Using Excel Tools – Handling missing values, removing duplicates, and text functions for cleaning.
6. Sorting and Filtering Data – Multi-level sorting and advanced filtering using custom criteria.
7. AI-Powered Data Cleaning – Using AI-based "Data Cleaning Wizard," detecting anomalies, and automatic data classification.

## Module 3: Descriptive Statistics using Excel (4 Hours)

8. Basic Statistical Analysis – Calculating mean, median, mode, standard deviation, and variance.
9. Using Data Analysis ToolPak – Generating histograms, correlation, and covariance tests.
10. AI-Assisted Statistical Summarization – Automating summary statistics using AI-driven tools.

## Module 4: Data Visualization (4 Hours)

11. Creating Basic Charts – Bar, line, pie, and scatter plots.
12. Formatting and Enhancing Charts – Customizing colors, labels, legends, and using trendlines.
13. Pivot Tables for Data Summarization – Creating pivot tables, pivot charts, and using slicers.

## Module 5: Advanced Data Analysis (6 Hours)

14. Lookup and Logical Functions – Using VLOOKUP, HLOOKUP, XLOOKUP, and logical IF statements.
15. Regression and Trend Analysis – Performing simple linear regression and identifying trends.
16. Hypothesis Testing – Conducting t-tests, ANOVA, and interpreting p-values.

## Module 6: AI-Powered Data Analysis (6 Hours)

17. AI-Driven Data Insights – Using "Analyze Data" for automatic trend detection and pattern recognition.
18. AI-Powered Forecasting – Using "Forecast Sheet" for trend prediction with AI models.
19. AI-Enhanced Data Visualization – AI-powered chart suggestions and creating dynamic dashboards.

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