Course Code	**23STMIP232**
Title of the Course	**Data Visualization and Statistical Analysis using Excel**
Offered to:	**B.Sc. Honours – Data Analytics**

Year of Introduction:	**2024-25**	**Semester:**	**3**
Course Category:	**MINOR**	**Course Relates to:**	**Local, Regional, National, Global**
Year of Revision	**2024 - 25**	**Percentage:**	**NA**
Type of the Course:		**Skill Development**	
Crosscutting Issues of the Course:		**NA**	
Pre-requisites, if any		**23STMAP121**	

Course Description:

This course provides data analytics students with hands-on experience in applying fundamental statistical methods using Excel. The course covers descriptive statistics, correlation, and regression analysis, equipping students with essential tools for analyzing and interpreting data in real-world scenarios. Students will learn how to perform key statistical analyses, visualize data, and draw meaningful insights, all through the powerful functionality of Excel.

S. No	COURSE OBJECTIVES
1	introduce the principles of descriptive statistics and their practical applications using Excel.
2	enable students to compute and interpret correlation coefficients and regression models.
3	provide hands-on experience in using Excel for data analysis, visualization, and statistical computations.
4	develop students' abilities to analyze relationships between variables and make data-driven decisions.
5	Identify the nature of the distribution with help of statistical measures

Course Outcomes: After completion of this course, student will be able to…

NO	COURSE OUTCOME	BTL	PO	PSO
CO1	understand and apply descriptive statistics to summarize and visualize data sets using Excel.	K2	1	1
CO2	analyze the strength and direction of relationships between variables through correlation analysis in Excel.	K4	1	1
CO3	apply linear regression models to predict and interpret outcomes based on real-world data, using Excel for computations.	K3	1	1
CO4	evaluate the fit of regression models and make data-driven recommendations based on statistical results.	K5	1	1

CO5	analyze the skewness and kurtosis of a given data set using Excel to assess the asymmetry and peakedness of the data distribution and interpret the implications for real-world scenarios.	K4	1	1

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyze; K5: Evaluate; K6: Create

CO-PO-PSO MATRIX									
CO NO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2							2	
CO2	3							3	
CO3	3							3	
CO4	3							3	
CO5	3							3	

Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

Course Structure

Unit I: Descriptive Statistics (2 Experiments)

1. **Lab Exercise 1: Computation of Measures of Central Tendency and Dispersion**
   - **Objective**: Use Excel to calculate measures of central tendency (mean, median, mode) and dispersion (range, variance, standard deviation) for given data sets.
   - **Cognitive Level**: Apply
   - **Description**: Students will work with real-world data sets and compute descriptive statistics, presenting results using Excel's statistical functions.

2. **Lab Exercise 2: Data Visualization Using Charts and Graphs (2 Experiments)**
   - **Objective**: Create histograms, box plots, and scatter plots in Excel to visualize data distributions and identify patterns.
   - **Cognitive Level**: Analyze
   - **Description**: Students will use Excel's charting tools to create visual representations of data, interpreting the patterns and distributions.

Unit II: Correlation (2 Experiments)

3. **Lab Exercise 1: Calculation of Pearson and Spearman Correlation Coefficients**
   - **Objective**: Use Excel to calculate and interpret Pearson's and Spearman's correlation coefficients for a given data set.
   - **Cognitive Level**: Apply
   - **Description**: Students will compute correlation coefficients and assess the strength of linear and monotonic relationships between variables.

4. **Lab Exercise 2: Scatter Plot and Correlation Analysis (1 Experiment)**
   - **Objective**: Generate scatter plots and perform correlation analysis using Excel to visually and quantitatively assess relationships between two variables.
   - **Cognitive Level**: Analyze
   - **Description**: Students will create scatter plots and use Excel's correlation functions to analyze the data, drawing conclusions based on the results.

Unit III: Regression

5.   **Lab Exercise 1: Simple Linear Regression (1 Experiment)**

- o   Objective: Use Excel to perform simple linear regression, calculating regression coefficients and predicting outcomes.
- o   Cognitive Level: Apply
- o   Description: Students will apply Excel's built-in functions to compute regression lines, interpret the slope and intercept, and predict values.

6.   **Lab Exercise 2: Multiple Linear Regression (1 Experiment)**

- o   Objective: Perform multiple linear regression analysis in Excel, analyzing the relationship between multiple independent variables and one dependent variable.
- o   Cognitive Level: Analyze, Evaluate
- o   Description: Students will use Excel's regression analysis tool to analyze multivariable relationships, evaluate the model's accuracy, and interpret regression coefficients.

Reference Book:

1.   **Lab Manual** – Prepared by the Department of Statistics.

2.   **Microsoft Excel Data Analysis and Business Modeling** by Wayne L. Winston

     A step-by-step guide to performing data analysis and statistical modeling using Excel.

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Lab Examination Evaluation

23STMIP232: Data Visualization and Statistical Analysis using Excel

Offered to: B.Sc. Honours (Data Analytics)

Max.Marks: 35   **Max.Time: 3Hours**   **Pass. Min: 14**

(A)	**Evaluation Procedure**		**35 Marks**
	I	Experiments (Exam & Execution)	**30 Marks**
	II	Viva	**3 Marks**
	III	Record	**2 Marks**
(B)	**CONTINUOUS ASSESMENT(Internal)**		**15 MARKS**

15 marks for the continuous assessment (Day to day work in the laboratory shall be evaluated for 15 marks by the concerned laboratory teacher based on the regularity/ record/viva). Laboratory teachers are mandated to ensure that every student completes 80%-90% of the lab assessments.

     TOTAL: (A)+(B) =   **50 MARKS**