Course Code	23STMIP231				
Title of the Course	Statistical Data Analysis Using SPSS				
Offered to:	B.Sc.(Honours) – Data Science				
L	0	T	0	P	2 C 1
Year of Introduction:	2024-25	Semester:			3
Course Category:	Minor	Course Relates to:		Local, Regional, National, Global	
Year of Revision:		NA	Percentage:		NA
Type of the Course:			SKILL DEVELOMENT		
Crosscutting Issues of the Course :			NA		
Pre-requisites, if any			Basics of Computers		

Course Description:

This course is designed to introduce students to the fundamentals of descriptive statistics and their application using SPSS statistical software. Students will learn how to summarize and describe data using various statistical measures and graphical representations. The course emphasizes hands-on experience in data analysis and interpretation.

Course Aims and Objectives:

S. No	COURSE OBJECTIVES
1	Understand the basic concepts of descriptive statistics, including measures of central tendency, dispersion, and shape.
2	Learn how to import and manage data in SPSS
3	Master the use of SPSS to calculate and interpret descriptive statistics.
4	Create effective graphical representations of data using SPSS.
5	Apply descriptive statistical techniques to analyze real-world datasets.

Course Outcomes

At the end of the course, the student will be able to…

NO	COURSE OUTCOME	BTL	PO	PSO
CO1	understand the SPSS packages and describing a variety of statistical variables in SPSS	K2	2	2
CO2	integrate and access the data base from different source of file	K1	2	2

	format.			
CO3	construct various charts and diagrams in SPSS	K3	2	2
CO4	construct the frequency tables in SPSS	K3	2	2
CO5	recommend the best statistical tool for basic statistical analysis.	K3	2	2

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

The lab list covers the key areas of a Statistical Methods, providing hands on practice with SPSS packages

Unit1: Data determination and various formats

Lab 1: Data Entry and Basic Manipulation

Objective: To learn how to enter data manually into SPSS and perform basic data manipulations.

Procedure:

1. **Create a New SPSS Data File:** Launch SPSS and create a new data file.
2. **Enter Data:** Manually enter data into the data editor, ensuring correct variable names, labels, and data types.
3. **Save the Data:** Save the data file in SPSS format (.sav).
4. **Basic Manipulations:**
   a. **Adding Variables:** Add new variables to the data file.
   b. **Modifying Variable Attributes:** Change variable names, labels, and data types.
   c. **Recoding Variables:** Create new variables based on existing variables using recoding rules.
   d. **Computing New Variables:** Calculate new variables using mathematical expressions or functions.

Lab 2: Importing and Exporting Data

Objective: To learn how to import and export data sets in various formats using SPSS.

Procedure:

1. **Import Data:**
   a. **Import from Excel:** Import data from an Excel spreadsheet into SPSS.
   b. **Import from Text Files:** Import data from text files (e.g., CSV, TXT) into SPSS.
   c. **Import from Other Statistical Software:** Import data from other statistical software (e.g., SAS, R) into SPSS.
2. **Export Data:**
   a. **Export to Excel:** Export SPSS data to an Excel spreadsheet.
   b. **Export to Text Files:** Export SPSS data to text files (e.g., CSV, TXT).

      c. **Export to Other Statistical Software:** Export SPSS data to other statistical software.
3. **Data Cleaning:**
      a. **Check for Missing Values:** Identify and handle missing values.
      b. **Correct Data Errors:** Correct any errors or inconsistencies in the data.
      c. **Format Data:** Ensure that the data is in the correct format for analysis.

Unit2: Construction of frequency table for raw and categorical data using SPSS

Lab 3: Frequency Table for Raw Data

Objective: To create a frequency table for a quantitative (raw) variable in SPSS.

Procedure:
1. **Load Data:** Open your SPSS data file containing the raw data.
2. **Select Variable:** Choose the quantitative variable for which you want to create a frequency table.
3. **Analyze Frequency:** Go to **Analyze > Descriptive Statistics > Frequencies**.
4. **Move Variable:** Move the selected variable to the "Variables" box.
5. **Run Analysis:** Click "OK" to generate the frequency table.

Lab 4: Frequency Table for Categorical Data

Objective: To create a frequency table for a categorical variable in SPSS.

Procedure:
1. **Load Data:** Open your SPSS data file containing the categorical data.
2. **Select Variable:** Choose the categorical variable for which you want to create a frequency table.
3. **Analyze Frequency:** Go to **Analyze > Descriptive Statistics > Frequencies**.
4. **Move Variable:** Move the selected variable to the "Variables" box.
5. **Run Analysis:** Click "OK" to generate the frequency table.

Unit3: Data visualization using SPSS – I

Lab 5: Creating a Basic Pie Chart

Objective: To create a simple pie chart to visualize the distribution of a categorical variable.

Procedure:
1. **Load Data:** Open your SPSS data file containing the categorical data.
2. **Select Variable:** Choose the categorical variable for which you want to create a pie chart.
3. **Analyze Charts:** Go to **Graphs > Legacy Dialogs > Pie**.
4. **Move Variable:** Move the selected variable to the "Categories" box.
5. **Customize Options (Optional):**
      a. **Titles and Labels:** Add appropriate titles and labels to the chart.
      b. **Explode Slices:** Highlight specific categories by exploding their slices.
      c. **Percentages:** Display percentages on each slice.
      d. **Formatting:** Customize the appearance of the chart (e.g., colors, fonts).
6. **Run Analysis:** Click "OK" to generate the pie chart.

Lab 6: Creating a Bar Chart in SPSS

Objective: To create a bar chart to visualize the distribution of a categorical or quantitative variable.

Procedure:

1. **Load Data:** Open your SPSS data file containing the variable you want to visualize.
2. **Select Variable:** Choose the variable for which you want to create a bar chart.
3. **Analyze Charts:** Go to **Graphs > Legacy Dialogs > Bar**.
4. **Move Variable:** Move the selected variable to the "Categories" box for categorical variables or the "X-axis" box for quantitative variables.
5. **Customize Options (Optional):**
   a. **Titles and Labels:** Add appropriate titles and labels to the chart.
   b. **Chart Type:** Choose the type of bar chart (e.g., simple, grouped, clustered).
   c. **Orientation:** Select the orientation of the bars (horizontal or vertical).
   d. **Statistics:** Display additional statistics (e.g., mean, median, standard deviation).
   e. **Formatting:** Customize the appearance of the chart (e.g., colors, fonts, gridlines).
6. **Run Analysis:** Click "OK" to generate the bar chart.

Unit4: Data visualization using SPSS – II

Lab 7: Creating a Histogram in SPSS

Objective: To create a histogram to visualize the distribution of a quantitative variable.

Procedure:

1. **Load Data:** Open your SPSS data file containing the quantitative data.
2. **Select Variable:** Choose the quantitative variable for which you want to create a histogram.
3. **Analyze Charts:** Go to **Graphs > Legacy Dialogs > Histogram**.
4. **Move Variable:** Move the selected variable to the "Variables" box.
5. **Customize Options (Optional):**
   a. **Titles and Labels:** Add appropriate titles and labels to the chart.
   b. **Bins:** Adjust the number of bins to control the level of detail in the histogram.
   c. **Frequency Curve:** Overlay a frequency curve (e.g., normal curve) on the histogram.
   d. **Cumulative Frequency:** Display a cumulative frequency curve.
   e. **Formatting:** Customize the appearance of the chart (e.g., colors, fonts).
6. **Run Analysis:** Click "OK" to generate the histogram.

Lab 8: Creating a Box Plot in SPSS

Objective: To create a box plot to visualize the distribution of a quantitative variable.

Procedure:

1. **Load Data:** Open your SPSS data file containing the quantitative data.
2. **Select Variable:** Choose the quantitative variable for which you want to create a box plot.
3. **Analyze Graphs:** Go to **Graphs > Legacy Dialogs > Boxplot**.
4. **Move Variable:** Move the selected variable to the "Variables" box.
5. **Customize Options (Optional)::**
   a. **Titles and Labels:** Add appropriate titles and labels to the chart.
   b. **Orientation:** Choose the orientation of the box plot (horizontal or vertical).
   c. **Outliers:** Specify how outliers should be displayed (e.g., points, symbols).
   d. **Formatting:** Customize the appearance of the box plot (e.g., colors, fonts).
6. **Run Analysis:** Click "OK" to generate the box plot.

Unit 5: Descriptive Statistical Analysis using SPSS

Lab 9: Comparing Descriptive Statistics for Multiple Variables

Objective: To compare the descriptive statistics of multiple quantitative variables.

Procedure:

1. **Load Data:** Open your SPSS data file containing the quantitative data.
2. **Select Variables:** Choose the multiple quantitative variables for which you want to compare descriptive statistics.
3. **Analyze Descriptive Statistics:** Go to **Analyze > Descriptive Statistics > Descriptives**.
4. **Move Variables:** Move the selected variables to the "Variables" box.
5. **Customize Options (Optional):**
   a. **Statistics:** Check the desired statistics (e.g., mean, median, mode, standard deviation).
   b. **Save:** Choose to save the calculated statistics as new variables.
   c. **Format:** Customize the output format.
6. **Run Analysis:** Click "OK" to generate the descriptive statistics for each variable.

Lab 10: Creating a Frequency Table with Grouped Data

Objective: To create a frequency table for grouped quantitative data in SPSS.

Procedure:

1. **Load Data:** Open your SPSS data file containing the grouped quantitative data.
2. **Select Variable:** Choose the grouped quantitative variable for which you want to create a frequency table.
3. **Analyze Frequency:** Go to **Analyze > Descriptive Statistics > Frequencies**.
4. **Move Variable:** Move the selected variable to the "Variables" box.
5. **Customize Options (Optional):**
   a. **Statistics:** Check the desired statistics (e.g., mean, median, mode, standard deviation).
   b. **Charts:** Choose the type of chart (e.g., histogram, bar chart).
   c. **Format:** Customize the output format.
6. **Run Analysis:** Click "OK" to generate the frequency table.

Question Paper Pattern for Core Lab Courses

23STMIP231: Statistical Data Analysis Using SPSS   **B.Sc. Hons Data Science**

(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**

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