



INTRODUCTION TO SPSS

Hands-on Workshop

S. RIYASDEEN

Assistant Professor of Mathematics,
Khadir Mohideen College,
Adirampattinam

20.08.2025

@ Sri Bharathi Arts and Science College for Women,
Pudukkottai

AGENDA

1 What is SPSS?

2 Why Use SPSS?

3 Interface at a Glance

4 Data Entry

5 Mean, Median, Mode, SD, Variance

6 Bar, line, pie Graphs

7 T-test, Chi-square

8 Correlation, Regression

9 ANNOVA

10 Q&A + Discussion

WHAT IS SPSS?

SPSS (Statistical Package for the Social Sciences) is a powerful statistical software used for:

- Data Analysis (Descriptive & Inferential)
- Data Management (Cleaning, Transformation)
- Visualization (Charts, Graphs)

WHY IS SPSS?

- User-friendly Interface (Menu-driven, no coding required)
- Supports Large Datasets
- Wide Range of Statistical Tests (t-test, ANOVA, Regression)
- Data Visualization (Bar charts, Histograms, Boxplots) Handles Missing Data

INTERFACE AT A GLANCE

Main Windows

- Data Editor – Where you enter and view data. Data View: Shows raw data (rows = cases, columns = variables).
- Variable View: Define metadata for variables (Name, Type, Label, Values, Measure).
- Output Viewer – Displays analysis results (tables, charts).
- Syntax Editor – Holds SPSS commands if you want automation or reproducibility.

INTERFACE AT A GLANCE

Key Menu Options

- File: Open, Save .sav, Import from Excel/CSV.
- Edit: Undo, Options (set decimal, fonts).
- View: Show/Hide toolbars, status bar.
- Data: Sort Cases, Split File, Select Cases.
- Transform: Compute Variable, Recode into Same/Different Variables.
- Analyze: Core for all tests – Descriptive, Compare Means, Regression, Correlation.
- Graphs: Chart Builder, Legacy Dialogs.

DATA ENTRY

- In Variable view add the names and details of the variables
- And in Data View enter the data you need to enter
- Eg:

[illegible]

CALCULATE MEAN, MEDIAN, MODE AND STANDARD DEVIATION

- Go to Analyze → Descriptive Statistics → Frequencies
- In the popup choose the columns you need to find Mean, Median, Mode, Standard Deviation, Variance,
- Then click Statistics there you choose the things you are going to calculate.

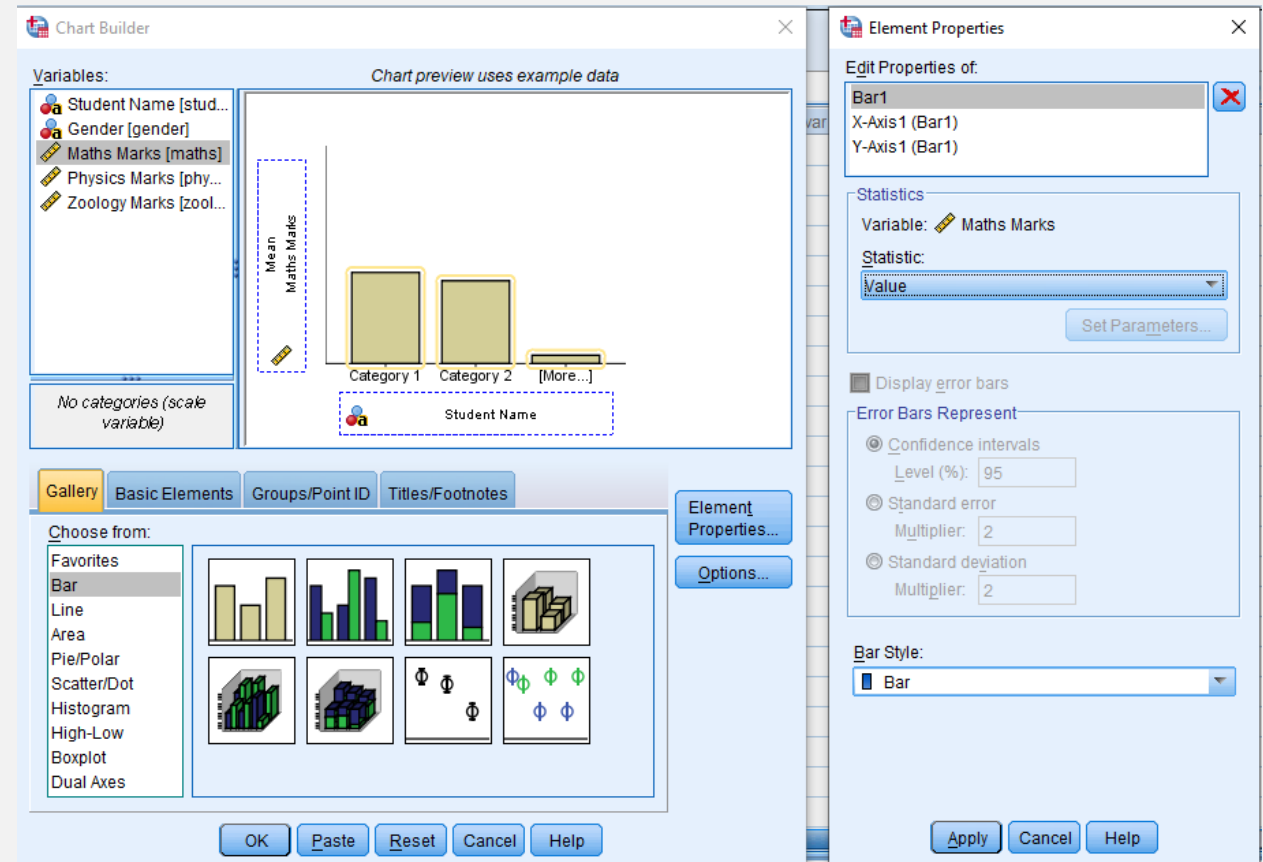
The screenshot shows the 'Frequencies: Statistics' dialog box. It has a title bar with a close button (X). The dialog is divided into several sections with checkboxes and input fields:

- Percentile Values:**
 - ☐ Quartiles
 - ☐ Cut points for: 10 equal groups
 - ☐ Percentile(s):
 - Buttons: Add, Change, Remove
- Central Tendency:**
 - ☐ Mean
 - ☐ Median
 - ☐ Mode
 - ☐ Sum
 - ☐ Values are group midpoints
- Dispersion:**
 - ☐ Std. deviation
 - ☐ Variance
 - ☐ Range
 - ☐ Minimum
 - ☐ Maximum
 - ☐ S.E. mean
- Distribution:**
 - ☐ Skewness
 - ☐ Kurtosis

At the bottom are three buttons: **Continue**, **Cancel**, and **Help**.

BAR GRAPH

- Go to Graphs → Chart Builder.
- In the Gallery tab, select Bar. Drag the Simple Bar icon to preview pane.
- Drag Maths to the Y-Axis.
- Drag Students to the X-Axis.
- Click Element Properties (top-right) → Under Statistic, choose: Value.



LINE GRAPH

- Go to Graphs → Chart Builder.
- In the Gallery tab, select Line. Drag the Simple Line graph icon to preview pane.
- Drag Maths, Physics & Zoology to the Y-Axis.
- Drag Students to the X-Axis.

The image shows two windows from the SPSS software interface. The 'Chart Builder' window is on the left, and the 'Element Properties' window is on the right.

Chart Builder Window:

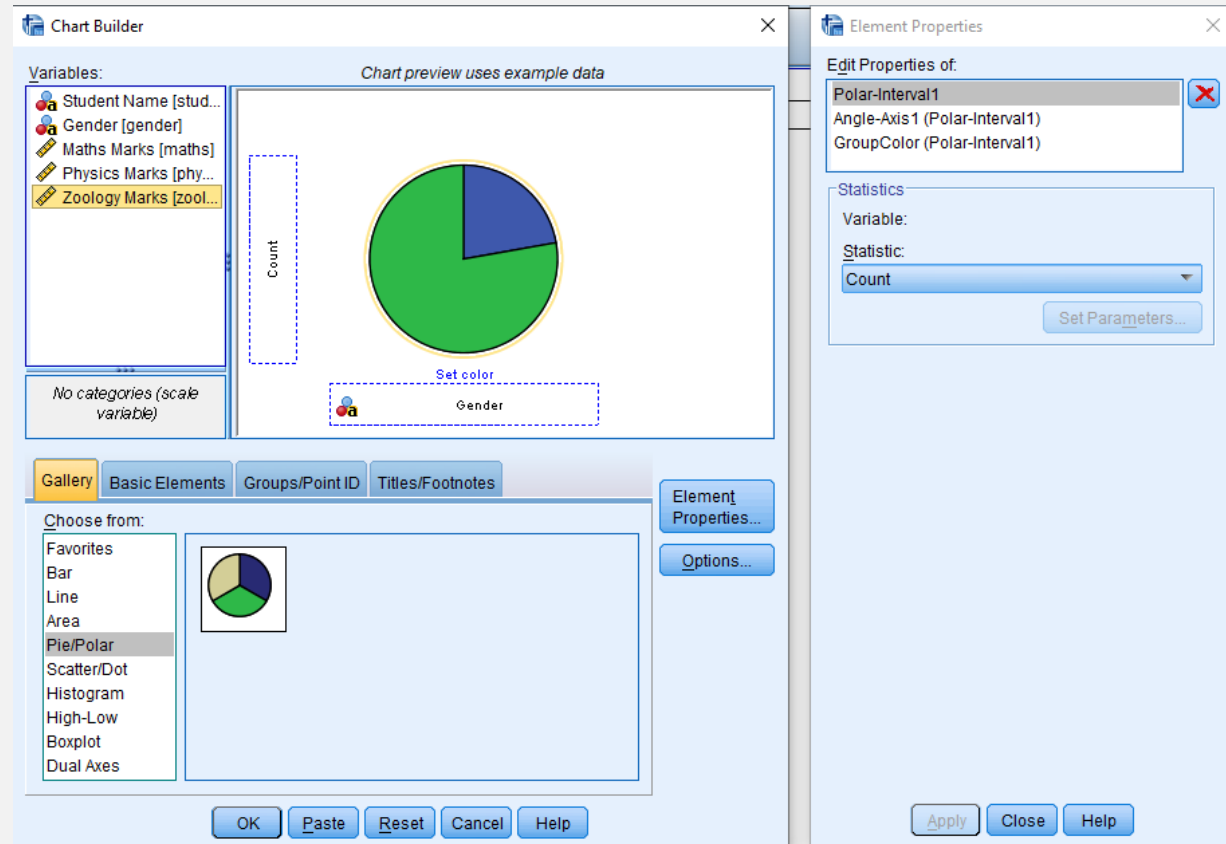
- Variables:** A list of variables including 'Student Name [stud...]', 'Gender [gender]', 'Maths Marks [maths]', 'Physics Marks [phy...]', and 'Zoology Marks [zool...]'.
- Gallery:** The 'Line' chart type is selected. A simple line graph icon is visible in the preview area.
- Preview:** A line graph is shown with three lines representing 'Maths Marks [Mean]', 'Physics Marks [Mean]', and 'Zoology Marks [Mean]'. The X-axis is labeled 'Student Name' and has categories 'Category 1' and 'Category 2'. The Y-axis is labeled 'INDEX'.
- Buttons:** 'OK', 'Paste', 'Reset', 'Cancel', and 'Help' are at the bottom.

Element Properties Window:

- Edit Properties of:** 'Line1' is selected.
- Statistics:** 'Variables: maths: Mean' and 'Statistic: Mean' are selected. A 'Set Parameters...' button is present.
- Display error bars:** A checkbox is checked. Under 'Error Bars Represent', 'Confidence intervals' is selected with a level of 95%. 'Standard error' and 'Standard deviation' are also options with multipliers set to 2.
- Interpolation:** 'Type: Straight' and 'Location: Left' are selected. A checkbox for 'Interpolate through missing values' is present.
- Buttons:** 'Apply', 'Close', and 'Help' are at the bottom.

PIE GRAPH

- Go to Graphs → Chart Builder.
- In the Gallery tab, select Pie/Polar. Drag the Pie Chart icon to preview pane.
- Drag Gender to Slice.



HISTOGRAM

- Go to Graphs → Chart Builder
- In the Gallery tab, select Histogram. Drag the simple Histogram icon.
- Drag Zoology to X-axis.

The screenshot shows the SPSS Chart Builder and Element Properties dialog boxes. The Chart Builder window has the 'Gallery' tab selected, showing a list of chart types on the left with 'Histogram' highlighted. The 'Variables' list on the right includes 'Student Name [stud...]', 'Gender [gender]', 'Maths Marks [maths]', 'Physics Marks [phy...]', and 'Zoology Marks [zool...]'. A preview of a histogram is shown in the center, with 'Zoology Marks' labeled on the x-axis. The 'Element Properties' window is open on the right, showing the 'Edit Properties of:' section with 'Bar1' selected. The 'Statistics' section shows 'Variable: Zoology Marks' and 'Statistic: Histogram'. The 'Error Bars Represent' section has 'Confidence intervals' selected with a level of 95%. The 'Bar Style' section shows 'Bar' selected.

Chart Builder

Variables:

- Student Name [stud...]
- Gender [gender]
- Maths Marks [maths]
- Physics Marks [phy...]
- Zoology Marks [zool...]

Chart preview uses example data

Histogram

Zoology Marks

No categories (scale variable)

Gallery Basic Elements Groups/Point ID Titles/Footnotes Zoology Marks

Choose from:

- Favorites
- Bar
- Line
- Area
- Pie/Polar
- Scatter/Dot
- Histogram
- High-Low
- Boxplot
- Dual Axes

Element Properties...

Options...

OK Paste Reset Cancel Help

Element Properties

Edit Properties of:

Bar1

X-Axis1 (Bar1)

Y-Axis1 (Bar1)

Statistics

Variable: Zoology Marks

Statistic: Histogram

Set Parameters...

Display normal curve

Display error bars

Error Bars Represent

- Confidence intervals
- Level (%): 95
- Standard error
- Multiplier: 2
- Standard deviation
- Multiplier: 2

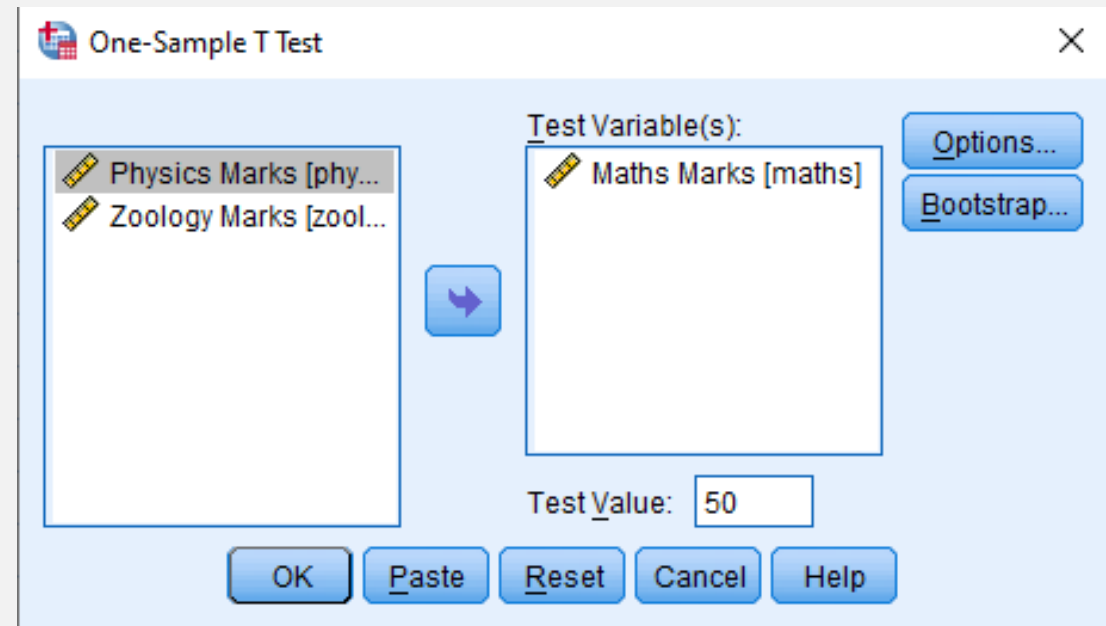
Bar Style:

Bar

Apply Close Help

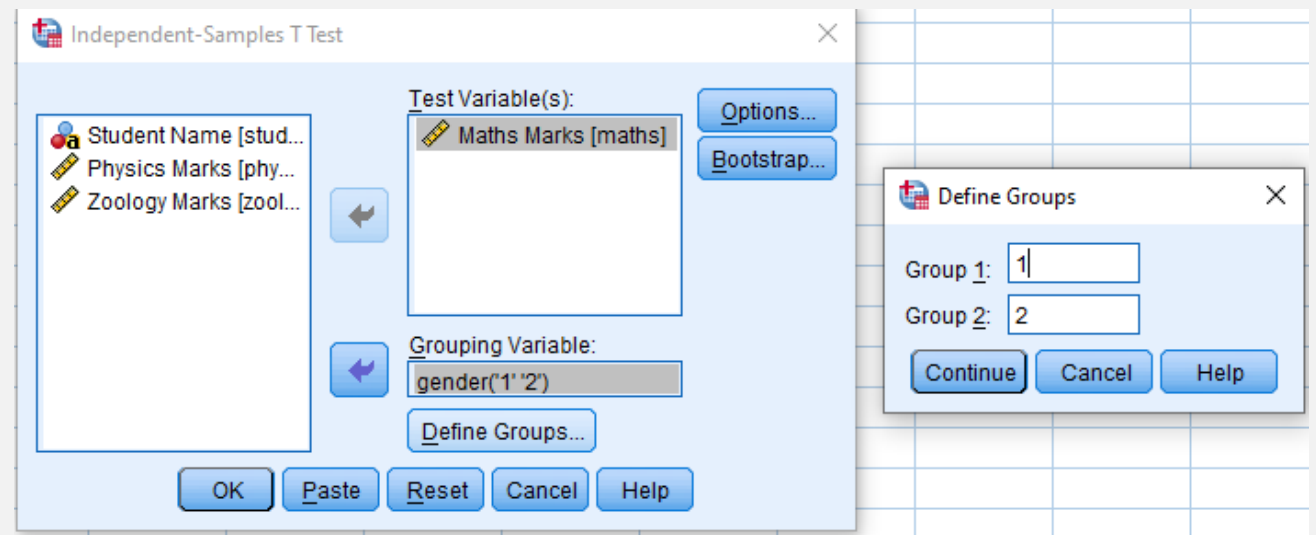
ONE SAMPLE T-TEST

- Go to Analyze → Compare Means → One-Sample T Test.
- In the Dialog box: Move Maths into the Test Variable(s) box. In the Test Value field, type 50 (We are going to test our hypothesis Mean Maths marks = 50).
- If p-value (Sig. 2-tailed) < 0.05, reject H_0 . If p-value ≥ 0.05 , fail to reject H_0 .
- This means there is no statistically significant difference between your sample mean (62.92) and the test value (50) at the 5% level.



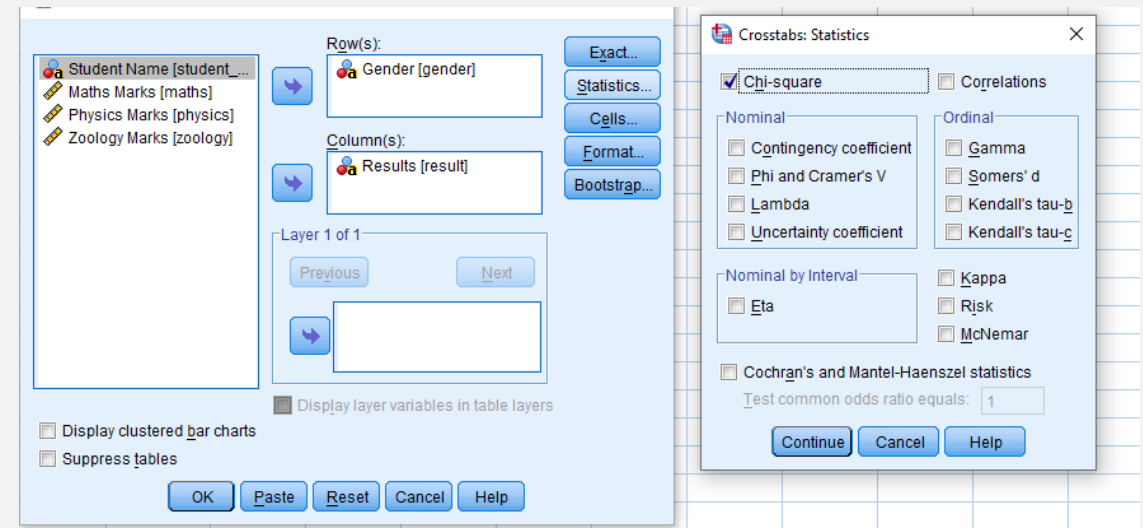
TWO SAMPLE T-TEST

- Go to Analyze → Compare Means → Independent-Samples T Test.
- Move Maths to Test Variable(s). Move Gender to Grouping Variable → Click Define Groups: Group 1 = 1 Group 2 = 2.
- If p-value (Sig. 2-tailed) < 0.05, reject H_0 . If p-value ≥ 0.05 , fail to reject H_0 .
- There is no statistically significant difference in Maths marks between Female students ($M = 66.13$) and Male students ($M = 56.50$), $t(4) = 0.357$, $p = 0.739$.



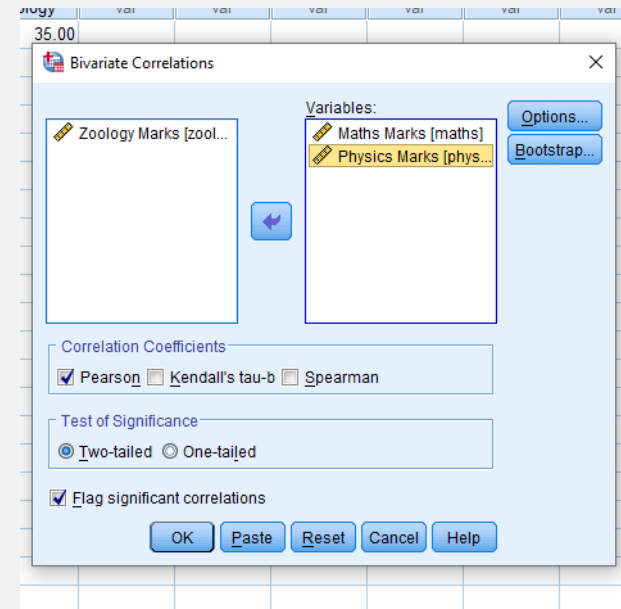
CHI-SQUARE TEST

- Analyze → Descriptive Statistics → Crosstabs.
- Row: Gender, Column: Pass.
- Statistics → Check Chi-square → OK.
- If $p < 0.05$ → Reject H_0 → Significant association between Gender and Results.
- If $p \geq 0.05$ → Fail to reject H_0 → No association.



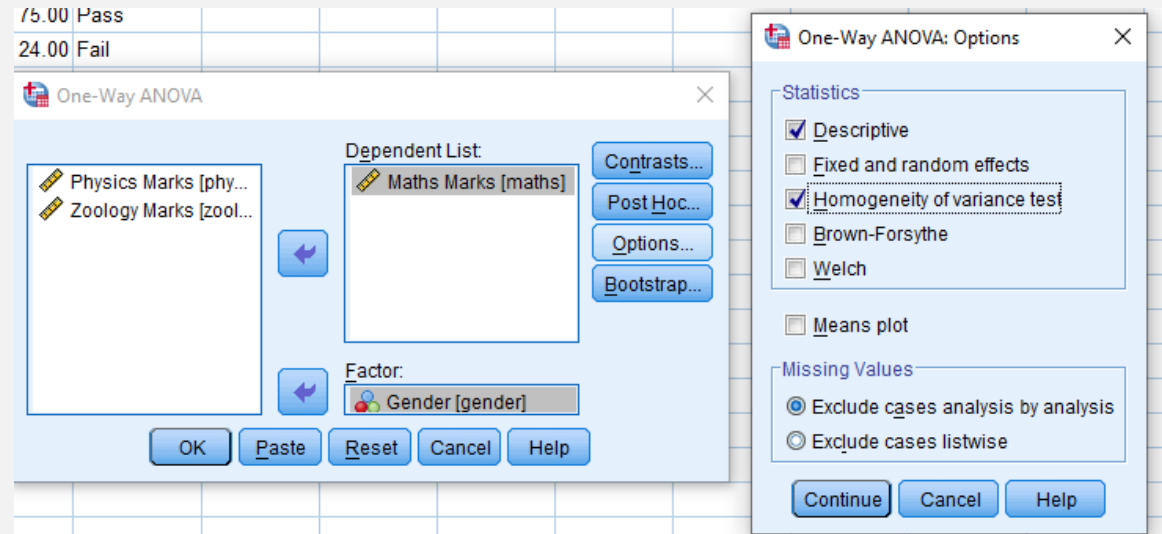
CORRELATION

- Go to Analyze → Correlate → Bivariate
- Select Maths, Physics → move them to the Variables box.
- Under Correlation Coefficients, keep Pearson checked.
- The correlation is very weak (almost no relationship) and negative, meaning that as Maths marks slightly increase, Physics marks very slightly decrease — but this is negligible. The p-value (0.836) is much greater than 0.05, so the correlation is not statistically significant.



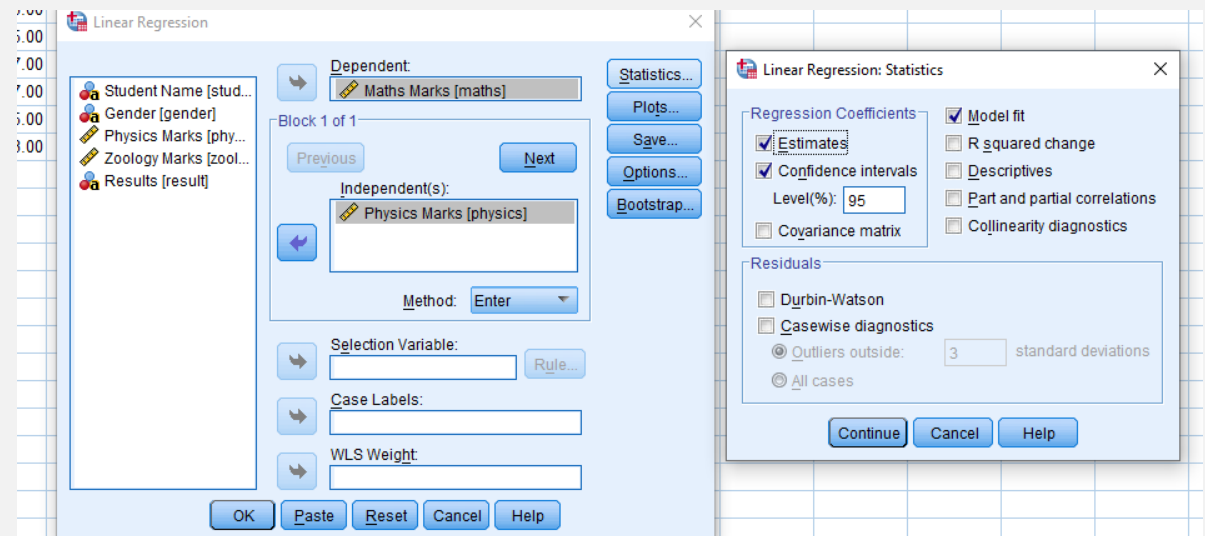
ANNOVA

- Analyze → Compare Means → One-Way ANOVA
- Dependent List: Maths Marks, Factor: Gender.
- Click Options, check: Descriptive, Homogeneity of variance test.
- $p\text{-value} = 0.739 (> 0.05) \rightarrow$ NOT significant. There is no statistically significant difference in Maths marks between male and female students.



REGRESSION (X ON Y, $Y=AX+B$)

- Analyze → Regression → Linear.
- Dependent: Maths (y), Independent(s): Physics (x).
- Statistics → tick Estimates, Model fit, Confidence intervals.
- $R = 0.110$ → Very weak correlation between Physics and Maths. $R^2 = 0.012$ → Only 1.2% of the variation in Maths marks is explained by Physics marks. Adjusted $R^2 = -0.235$ → Negative because the model is not useful (sample too small).
- Intercept (Constant, b): 76.917 Slope (Physics, a): -0.239



Q&A + DISCUSSION

Email: riyasafrim@kmc.edu.in

Website: www.kalvikraft.in