



B.Com Honours

Semester IV

Calicut University

STATISTICAL SOFTWARE FOR DATA ANALYSIS

Course Code: COM4FV110 • Module 3 Notes

Module III: Preliminary Data Analysis & Visualization in SPSS

Covers descriptive statistics, graphical data exploratory tools, normality testing, outlier identification, and Cronbach's alpha scale reliability testing.

Unit 9: Descriptive Statistics & Categorical vs. Continuous Variables

Categorical variables analyzed via Analyze → Descriptive Statistics → Frequencies (counts, percentages). Continuous variables analyzed via Descriptive Statistics → Descriptives (Mean, Std Dev, Min, Max).

Unit 10: Assessing Normality & Outlier Detection

Tests: Kolmogorov-Smirnov & Shapiro-Wilk (Analyze → Descriptive Statistics → Explore). If ($p > 0.05$), distribution is normal. Outliers identified via Boxplots (values > 1.5 IQR beyond quartiles) and Z-score transformations ($(|Z| > 3.29)$).

Unit 11: Graphical Data Representations & Interpretation

Histograms with normal curves, Bar Charts, Line Graphs, Scatter Plots, and Box Plots generated via Graphs → Chart Builder.

Unit 12: Editing SPSS Graphs & Exporting to Word

SPSS Chart Editor: Double-clicking charts to modify color palettes, axis labels, title headers, and exporting via Copy Special as Image/Metafile into Word documents.

Unit 13: Reliability Analysis & Cronbach's Alpha Output Interpretation

Scale reliability evaluated via Analyze → Scale → Reliability Analysis.

$$\text{Cronbach's Alpha } \alpha = \frac{K}{K - 1} \left(1 - \frac{\sum \sigma_i^2}{\sigma_t^2} \right)$$

Rule of thumb: alpha ≥ 0.70 indicates acceptable scale reliability.

Practical Case Framework (SPSS Scale Reliability Output Table): Analyze SPSS Reliability Statistics output for a 5-item customer satisfaction scale.

SPSS Reliability Statistics & Item-Total Analysis Output:

Scale Item Code	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
q1_speed	16.20	12.45	0.685	0.812
q2_courtesy	16.15	11.90	0.720	0.801
q3_accuracy	16.30	12.10	0.710	0.804
q4_value	16.05	13.20	0.590	0.835
q5_overall	16.10	11.80	0.745	0.795

Overall Cronbach's Alpha $\alpha = \mathbf{0.838}$ (5 Items, N = 150) → Excellent Scale Reliability!

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