

Skill Based/Specialized Laboratory (SB) Courses

Skilled Based/Specialized Laboratory (SB) Course 4a: Data Analysis using SPSS

Structure 1: PG Curricular Structure with only Course Work

Course Title & Code	Credits	Credit Distribution of the Course			Eligibility Criteria	Prerequisite of the course (if any)
		Lecture (00 Hours)	Tutorial (00 Hours)	Practical (60 Hours)		
SB 4a: Data Analysis using SPSS	2	0	0	2	NIL	NIL

Course Objectives:

- To familiarize students with data analysis using a statistical software package SPSS.
- To provide skills for research analysis and increase employability.
- To lay a foundation for advance data analysis work and higher education.

Course Learning Outcomes:

- Understand basic functions of SPSS for managing variables and generate descriptive statistics to describe the data and analyze data through graphs and charts.
- Test differences in sample means.
- Identify relationships between variables and develop models for predicting dependent variables on the basis of independent variables.
- Understand data structures and identify clusters in data.
- Identify principal components that are relevant from a host of variables.

Unit I (15 Hours)

Bivariate Analysis: Crosstabulation, Chi-square test of association, Bivariate Correlation (Pearson and Spearman), Simple Scatterplots. Descriptive Statistics Procedures: Frequencies, Descriptive, Explore. Graphs: Creating and editing graphs and charts. Hypothesis Testing: t-tests: One sample test, independent samples and paired samples t-test; ANOVA - One way analysis of variance, Two way analysis of variance, Parametric and Non-Parametric test: Run test, Wilcoxon signed-rank test, Kolmogorov–Smirnov test, Mann-Whitney U test, Kruskal-Wallis test, Friedman.

Unit II (15 Hours)

Understanding the principles of randomization, replication, and blocking; Application of One-way and Two-way classification models using SPSS; Analysis of data from Completely Randomized Design (CRD), Randomized Block Design (RBD), and Latin Square Design (LSD) through General Linear Model (GLM) procedures; Linear Regression: Simple Linear Regression, Multiple regression analysis,

Unit III (15 Hours)

Logistic Regression model, Lack-of-Fit tests in logistic regression. Time Series Analysis: Understanding components of a time series (trend, seasonal, cyclical, irregular); Creating and editing time series plots; Conducting trend analysis using SPSS; Smoothing techniques – Moving Average and Exponential Smoothing methods; Model identification and forecasting using SPSS; Auto-correlation and partial autocorrelation plots.

Unit IV (15 Hours)

Hierarchical Cluster analysis and K-Means Cluster Analysis, Factor analysis, Principal Components Analysis, Discriminant Analysis.

Essential Reading:

1. George. D and Paul Malley (2010): *SPSS for Windows Step by Step A Simple Guide and Reference*.
2. Lawrence, S., Meyers, L.S., Gamst, G.C. and Guarino, A.J. (2013): *Performing Data Analysis using IBM SPSS*, John Wiley & Sons.

Suggested Readings:

1. Pandya, K., Bulsari, S. and Sinha, S. (2011): *SPSS in Simple Steps*, Dreamtech Press.