FAROOK TRAINING COLLEGE

(RESEARCH CENTER IN EDUCATION UNIVERSITY OF CALICUT)
Govt. Aided College Affiliated to University of Calicut and Recognized by NCTE & UGC
Reaccredited by NAAC at A Grade with CGPA 3.25 (2024-29)
Accredited by SAAC at A+ Grade with CGPA 3.39(2021-26)

Value Added Course

Basics in Data Analysis

For M.Ed. Students

Basics in Data Analysis

Course Objectives:

1. Demonstrate proficiency in Excel by effectively using basic functions for data entry, formatting, and organization.
2. Utilize Excel's statistical functions to perform fundamental data analysis and calculations.
3. Apply SPSS tools and features to create datasets, enter data accurately, and manipulate variables.
4. Perform various statistical analyses in SPSS to interpret and summarize data effectively.
5. Create and customize data visualizations such as charts and graphs in both Excel and SPSS to enhance data interpretation.
6. Conduct statistical tests (e.g., t-tests, ANOVA, regression) to analyze and validate data-driven insights.
7. Interpret statistical outputs from Excel and SPSS to make informed decisions based on data findings.
8. Apply data analysis techniques to solve real-world business, social science, or research-related problems using Excel and SPSS.

Course Structure:

Module 1: Excel Fundamentals (7 hours)

Introduction to the Excel interface and worksheet structure, Essential formulas and functions (SUM, AVERAGE, COUNT, IF, AND, OR), Using cell references and absolute/relative referencing, Basic formatting for data presentation and readability, Efficient data entry techniques and error handling, Data validation and conditional formatting for structured datasets, Sorting and filtering data for better organization, Creating and managing tables for structured data representation, Introduction to statistical analysis in Excel, Using functions like MEAN, MEDIAN, MODE, STDEV, and CORREL for data insights,

Module 2: Excel Charts & Visualization (3 hours)

Understanding the importance of data visualization. Selecting appropriate chart types (e.g., bar, column, pie, line, scatter plots), Creating charts from datasets using Excel's

built-in tools, Customizing charts (titles, labels, legends, colors, and themes)., Enhancing visual appeal with formatting techniques, Using dynamic charts for interactive data presentation, Best practices for designing effective and professional charts.

Module 3: Introduction to SPSS (8 hours)

Understanding different types of statistical tests, Creating new SPSS files and opening existing datasets, Understanding variable types and defining variable properties, Entering data manually and importing data from external sources, Structuring datasets for effective analysis, Filtering and selecting specific cases for analysis, Recoding variables and computing new variables, Handling missing data and data cleaning techniques, Generating frequency tables, means, and standard deviations, Exploring measures of central tendency and dispersion, Understanding the importance of normality in statistical analysis, Performing graphical tests (histograms, Q-Q plots, boxplots), Conducting statistical tests for normality (Kolmogorov-Smirnov, Shapiro-Wilk)

Module 4: Advanced SPSS Analysis (7 hours)

Introduction to data visualization in SPSS, Creating bar charts, histograms, and boxplots, One-sample t-test to compare sample means to a known value, Independent sample t-test to compare means between two different groups, Paired sample t-test to analyze pre-post measurements within the same group, Concept of ANOVA and when to use it, Performing a one-way ANOVA to compare means across multiple groups, Checking assumptions of ANOVA (homogeneity of variances, normality), Post-hoc tests (Tukey, Bonferroni, Scheffee) for group comparisons, Understanding correlation and its significance, Computing Pearson’s correlation for linear relationships between continuous variables, Spearman’s rank correlation for ordinal data, Creating scatterplots to visualize correlations.

Module 5: Further SPSS Functions (5 hours)

Understanding item analysis and its importance in test development. Performing item difficulty and item discrimination analysis, Concept of reliability and validity in research,

Calculating Cronbach's Alpha for internal consistency, Conducting split-half reliability and test-retest reliability, Performing factor analysis to assess construct validity, Two-way ANOVA, Three-way ANOVA, ANCOVA, Regression analysis.

Assessment

- Written Test
- Assignment