

**Course Module**  
**For**  
**Certificate Course in**  
**Advanced SPSS**

**Evaluation Pattern:** On the basis of MCQ exam followed by Viva Voce

**Total Duration required:** 30 Hours

**Course Structure**

S.No.	Contents Deliverance	Learning Outcomes
1	Basic on variable, data reading and editing, Data interpretation, Sampling size selection and sampling error (2hrs)	Students will be able to apply fundamental concepts of variables, effectively read and edit data, interpret data accurately, select appropriate sampling sizes, and understand and mitigate sampling errors.
2	Measure of central tendency : calculation of Mean, Median and Mode (2hrs)	Students will demonstrate the ability to calculate measures of central tendency, including mean, median, and mode, and comprehend their significance in analyzing and summarizing data.
3	Variance ,standard deviation , Range, Sample mean, variance, S.D , Coefficient of variation (2hrs)	Students will be proficient in calculating and interpreting variance, standard deviation, range, sample mean, sample variance, sample standard deviation, and coefficient of variation, and apply these measures to assess data variability.
4	Basics : Parametric testing (3hrs)	Students will gain a solid foundation in the basics of parametric testing, understanding its underlying principles, assumptions, and appropriate application in analyzing data, enabling them to make informed statistical inferences.
5	Tests for mean and variance, t test (2hrs)	Students will be capable of conducting hypothesis tests for mean and variance, particularly using the t-test. They will also interpret the results accurately, allowing for sound decision-making and drawing valid conclusions.

6	Chi square test and test for proportions (2hrs)	Students will develop the skills necessary to perform chi-square tests and tests for proportions, enabling them to analyze categorical data effectively and assess associations and differences between categorical variables.
7	ANOVA (2hrs)	Students will be proficient in applying analysis of variance (ANOVA) to compare means across multiple groups, and they will interpret ANOVA results to determine significant differences between the group means.
8	Non Parametric hypothesis testing (2hrs)	Students will gain competence in nonparametric hypothesis testing, including the utilization of tests such as the Wilcoxon Sign Rank Test, Sign Test, Kruskal Wallis one-way test, Whitney U test, and Spearman Rank correlation coefficient test, enabling them to make reliable statistical inferences in situations where parametric assumptions are not met.
9	Levene's test (2hrs)	Students will possess the ability to perform Levene's test, allowing them to assess the equality or inequality of variances in different groups and make informed decisions based on the results.
10	Wilcoxon Sign Rank Test (2hrs)	Students will develop proficiency in conducting the Wilcoxon Sign Rank Test, enabling them to compare paired data sets and make valid statistical inferences when parametric assumptions are not met.
11	Sign test (2hrs)	Students will acquire the necessary skills to conduct the Sign Test, allowing them to analyze the direction and significance of differences within paired data sets.
12	Kruskal Wallis one way test (2hrs)	Students will gain a comprehensive understanding of the Kruskal Wallis one-way test, enabling them to compare medians across multiple independent groups and draw appropriate conclusions from the results.
13	Mann-Whitney U test (2hrs)	Students will be capable of performing the Whitney U test, allowing them to compare independent samples and make reliable statistical inferences when parametric assumptions are violated.
14	Spearman's Rank correlation coefficient test & Regression test (3hrs)	Students will develop proficiency in applying the Spearman Rank correlation coefficient test, enabling them to assess the strength and direction of monotonic relationships between variables and interpret the significance of the results accurately.

## References:

- SPSS for Beginners by Vijay Gupta, Published by VJ Books Inc.
- Parametric and Nonparametric "Statistical procedures", Third Edition by David J. Sheskin ii. Statistics Principles and Methods, Sixth Edition by Richard A. Johnson and Gouri K. Bhattacharyya, John Wiley & Sons, Inc.
- Discovering statistics using SPSS , second edition by Andy Field , Sage publication