

## STATISTICAL APPLICATIONS IN RESEARCH

4 credits (Pr)

### Objectives

This course will enable students to:

1. Discriminate between parametric and non-parametric tests
2. Learn to apply statistical tests for data analysis for both large and small samples
3. Know how to interpret the results of statistical analysis of data
4. Be able to summarize data and present it using tables and graphs
5. Develop skills for preparation of research proposals
6. Understand the components of a research report

Module No	Topics	Number of credits
1	<b>Introduction to Statistics</b> Definition, conceptual understanding of statistical measures, popular concepts and misuse of statistics  <b>Normal Distribution and its Properties</b> a. Normal distribution b. Binomial distribution c. Probability, use of normal probability tables, area under normal distribution curve d. Parametric and non-parametric tests  <b>Data Management</b> Planning for data analysis – coding of responses, preparation of code book Coding of data Use of statistical programs - MS Excel - SPSS	1
2	<b>Data Analysis</b> a. Quantitative analysis, descriptive statistics, inferential statistics : Uses and limitations, Summation sign and its properties b. Proportions, percentages, ratios c. Measures of central tendency-mean, median, mode-arithmetic mean and its uses, mid – range, geometric mean, weighted mean d. Measures of dispersion /variability- range, variance, standard deviation, standard error, coefficient of variation, Kurtosis, skewness Grouped data-frequency distribution, histogram, frequency polygons, percentiles, quartiles, tertiles, ogive	1

	<p><b>e. Large and Small Sample tests and interpretation</b></p> <ul style="list-style-type: none"> <li>- . Z-test for single proportions and difference between proportions</li> <li>- . Large sample test for single mean and difference between means</li> <li>- . Small sample tests- 't'-test, paired 't'-test, 'F' Test</li> </ul>	
<b>3</b>	<p><b>Chi square test and its interpretation</b></p> <ul style="list-style-type: none"> <li>a. General features, goodness of fit</li> <li>b. Independence of Attributes</li> </ul> <p><b>Correlation and Regression and its interpretation</b></p> <ul style="list-style-type: none"> <li>a. Basic concepts</li> <li>b Linear regression and correlation coefficient</li> </ul> <p>Regression and prediction</p> <ul style="list-style-type: none"> <li>c. Rank correlation, Product-moment method</li> </ul> <p><b>Analysis of Variance and its interpretation</b></p> <ul style="list-style-type: none"> <li>a. One-factor analysis of variance</li> <li>b. Two-factor analysis of variance</li> </ul> <p><b>Design of Experiments</b></p> <ul style="list-style-type: none"> <li>a. Completely randomized design</li> <li>b. Randomized block design</li> <li>c. Latin square design</li> <li>d. Factorial design</li> </ul>	<b>1</b>
<b>4</b>	<p><b>Presentation of Data</b></p> <ul style="list-style-type: none"> <li>a. Tabulation and Organization of data- frequency distributions, cumulative frequency distribution, contingency tables</li> <li>b. Graphical presentation of data- histogram, frequency polygon, ogive, stem and leaf plot, box and whiskers plot,</li> </ul> <p>Graphs for nominal and ordinal data- pie diagram, bar graphs of different types, graphs for relation between two variables, line diagram. Use of illustrations Cautions in visual display of data</p> <p><b>The Research Report</b></p> <p>Basic components of a research report- prefatory material, introduction and Review of Related Literature, Methodology, Results, Discussion, Conclusion, Summary, Abstract, Bibliography and Appendices</p> <p><b>Students to design a research study on a topic-</b></p> <ul style="list-style-type: none"> <li>- specify type of research</li> <li>- sample selection</li> <li>- protocol/operationalization</li> <li>- tools</li> <li>- tests for statistical analysis</li> </ul> <p><b>Preparation of a Research Proposal</b></p>	<b>1</b>