

ADD ON COURSE 2022-23		
STATISTICAL DATA ANALYSIS		
Duration: 30 Hours	Department of Mathematics	Course code: MAT-SDA
<p>Course Description: This course introduces students to statistical methods and techniques for analysing data. Students will learn how to summarize, visualize, and interpret data using descriptive and inferential statistics. Topics include probability distributions, hypothesis testing, regression analysis, and multivariate techniques. Through hands-on exercises and real-world applications, students will develop practical skills in statistical data analysis using software tools such as R or Python.</p> <p>Course Objectives:</p> <ol style="list-style-type: none"> 1. Understand fundamental concepts of statistical data analysis. 2. Learn techniques for summarizing and visualizing data. 3. Gain proficiency in hypothesis testing and statistical inference. 4. Explore regression analysis and its applications. 		
Module 1:		07 Hours
<p>Introduction to Statistical Data Analysis: Definition of statistics and its applications, Types of data and measurement scales, Overview of statistical software (e.g., R, Python) Descriptive Statistics: Measures of central tendency (mean, median, mode), Measures of dispersion (variance, standard deviation), Data visualization techniques (histograms, box plots)</p>		
Module 2:		07 Hours
<p>Probability Distributions: Discrete and continuous probability distributions, Normal distribution and its properties, Sampling distributions and the central limit theorem Statistical Inference: Estimation of population parameters (confidence intervals), Hypothesis testing principles, Types of errors and significance levels</p>		
Module 3:		07 Hours
<p>Parametric Hypothesis Tests: t-tests for means comparison, Analysis of variance (ANOVA), Chi-square tests for independence Non-parametric Methods: Mann-Whitney U test, Wilcoxon signed-rank test, Kruskal-Wallis test Regression Analysis: Simple linear regression, Multiple linear regression, Model evaluation and diagnostics</p>		
Module 4:		07 Hours
<p>Correlation Analysis: Pearson correlation coefficient, Spearman rank correlation, Interpretation of correlation results Multivariate Analysis: Principal component analysis (PCA), Factor analysis, Cluster analysis Time Series Analysis: Time series data and components, Trend analysis, Seasonal decomposition</p>		
<p>Textbook:</p> <ol style="list-style-type: none"> 1. "Statistics for Business and Economics" by Paul Newbold, William L. Carlson, and Betty Thorne 2. "Introduction to Statistical Learning" by Gareth James, Daniela Witten, Trevor Hastie, and Robert Tibshirani 		

