Objectives: To impart basic managerial skills for collection & analysis of statistical data. To learn about graphical and modelling techniques for exploring data, with an emphasis on visualization, interpretation, and clear communication of findings.

Unit I: Introduction to Statistical Methods: Statistics & Managerial Decisions, Statistical Data, Operation Research Techniques.

Unit II: Data Collection And Analysis: Collection and presentation of data in terms of tables, graphs, raw data, frequency distributions, histogram etc. Cumulative frequency curve, Measures of central tendency and location, Partition values, Comparison of various measures of central tendencies, Measures of dispersion, skewness & kurtosis, comparison of various measures of dispersion.

Unit III: Probability Distribution & Statistics: Introduction of Probability, sample, space & events, Basic rules of probability, permutation & combinations, conditional probability, Bayes' theorem, distributions: Binomial, Poisson, Exponential and Normal distribution with their properties and application. Random variables –discrete and continuous probability distribution functions

Unit IV: Correlation And Regression Analysis: Curve fitting, correlation and regression analysis, Autocorrelation, Multiple regression, statistical Inference & estimation applied to Industrial problems.

Unit V: Understanding Data for Exploratory Analysis: Exploratory data analysis and data visualization, Perception, Continuous variables, Discrete variables, Dependency relationships, Multivariate categorical variables, Temporal data, Spatial data Data Science Pipeline: Collect, Import, Clean, Transform, Visualize, Model, and Communicate.

Unit VI: Statistical Tests and Testing of Hypothesis: Elementary theory and practice of sampling, standard error or means and variance, tests of significance, T test, F test, Z test and chi-square test along with their applications, Goodness of fit, testing of hypotheses and decision making, analysis of variance (ANOVA).

Unit VII: Elementary Mathematics: Solution of simultaneous linear equations & quadratic equations, Combinatorial mathematics (Simple rules of counting), Vectors, Matrices & Determinants, Solution of linear programming problems with two variables using graphs, Solution of linear and integer programming problems using EXCEL SOLVER, Functions, Limit & Continuity, Differentiation and Integration, Definite integrals.

Reference Books

1. Quantitative Techniques for Managerial Decision by U. K. Srivastava, G. V. Shenoy and S. C. Sharma New Age International Publishers.
2. Probability & Statistics for Engineers by Rao SCITECH
3. Statistics for Management by Lewis Pearson

4. Graphical Data Analysis with R by Unwin, Antony CRC Press, 2015 ISBN 978-1498715232

5. Interactive Data Visualization for the Web by Scott Murray O'REILLY, Second edition, ISBN-13: 978-1491921289