Semester: III	
Course Name: Quantitative Techniques for Management – I	
Course Type: Major	**Course Code: C2BMS2332**
Credit: 5	**Full Marks: 100**

LEARNING OBJECTIVES:

The course aims to introduce students to a range of Statistical Data Analysis tools essential for informed decision-making. Special attention will be given to applying these concepts in diverse financial and managerial contexts. Through this course, students will develop enhanced critical thinking and problem-solving abilities rooted in Statistical Methods and Data Analysis methodologies.

LEARNING OUTCOMES:

On successful completion of the course the learner will be able to:

- Present, classify and visualise data sets using Descriptive statistics
- Analyse the relationship between two variables of various managerial situations
- Understand and apply the concept of index numbers to various managerial fields
- Apply the concept of derivatives and partial derivatives to various analytical tools and decision-making problems
- Solve managerial decision problems using Probability Distributions.
- Use matrices for solving equations arising in various decision-making contexts

DETAILED SYLLABUS:

MODULE – I [30 MARKS]

Unit 1: Descriptive Statistics (16L)

Measures of Central tendency
Mean (arithmetic mean, geometric mean, harmonic mean), Merits, limitations, suitability and applications of averages, relation between averages, median, mode, quartiles, deciles, percentiles.

Measures of Dispersion
Range, Quartile deviation, mean deviation, standard deviation and their coefficients, combined standard deviation for two groups.

Moments, Skewness, Kurtosis
Raw moments, central moments, relation between central and non-central moments, β and γ coefficients, different measures of skewness and kurtosis.

Unit 2: Correlation & Regression Analysis [12L]

Correlation analysis

Meaning and significance of correlation, types of correlation, and methods of studying simple correlation – scatter diagram, Karl Pearson's coefficients of correlation, Spearman rank correlation coefficient, properties: $-1 \le r \le 1$, effect of change in origin and scale on correlation coefficient.

Regression analysis

Meaning and significance of regression, Derivation of regression equations by least squares method, properties of regression equations, regression coefficients, properties of regression coefficients and its relation with correlation coefficient.

MODULE – II [25 MARKS]

Unit 3: Probability [15L]

Basic Probability

Classical definition of probability, conditional probability, independence of events, Bayes' theorem (application only).

Mathematical Expectation

Random variable, idea of probability mass function and probability density function, concepts of expectation, variance, basic properties.

Probability Distributions

Binomial, Poisson and Normal distributions – Properties and applications.

MODULE – III [15 MARKS]

Unit 4: Index Numbers [15L]

Meaning and significance, Aggregate and Relative methods of constructing index numbers – unweighted and weighted: Laspeyres', Paasche's, Edgeworth – Marshall's, Fisher's methods, Test of adequacy of index numbers, Chain base index number, Cost of living index number, Base shifting, splicing and deflating index number, Real wage and Purchasing power.

Unit 5: Calculus [6L]

Basic rules of differentiation, second order derivatives, concept of functions of several variables, partial derivatives up to second order, implicit differentiation using partial derivatives.

Unit 6: System of Linear Equations and Matrices   **(5L)**

Addition and multiplication of Matrices, application of Gauss-Jordon method for finding inverse of a matrix up to order 3 and solving a system of linear equations.

SUGGESTED TEXT BOOKS/ READING MATERIALS:

1. Chakrabarty, J, Business Mathematics & Statistics, Dey Book Concern
2. Gupta, S.C. and Gupta, Indra, Business Statistics, Himalaya Publishing House
3. Das, J.K., Statistics For Business Decisions, Academic Publishers
4. Gupta, S. C. Fundamentals of Statistics, Himalaya Publishing House
5. Das, N. G. and Das, J. K., Business Mathematics and Statistics, Tata McGraw Hill
6. Levin, R. I. and Rubin, D. Statistics for Management, Prentice-Hall of India
7. Aczel ,A. D. and Sounderpandian, J., Complete Business Statistics, Tata McGraw Hill
8. Johnson, R. A. and Wichern, D. W., Applied Multivariate Statistical Analysis, Prentice-Hall of India
9. Srivastava, U.K. and Sharma, S.C., Quantitative Techniques for Managerial Decisions – New Age International
10. Sharma, J.K., Business Statistics, Pearson Education