Semester III

Course name: BUSINESS MATHEMATICS AND STATISTICS - 1

Course code: M2BC230311T

Course Credits: 4

Pedagogy: The lecture series will adopt a blended approach, combining traditional "chalk and talk" methods with multimedia-enhanced presentations using PowerPoint. This dual approach aims to cater to diverse learning styles, providing clarity through traditional explanations while utilizing visual aids to enhance comprehension. Class discussions, problem-solving exercises, and Q&A sessions will be incorporated to engage students in the learning process. The chalk and talk method will allow for immediate clarification of doubts and personalized attention.This pedagogical approach aims to create an engaging and supportive learning environment, ensuring that students acquire a solid foundation in business mathematics and statistics through a combination of traditional teaching methods and modern technological aids.

Course Description: This course provides a comprehensive exploration of the statistical and mathematical principles essential for business applications. The statistical component covers Descriptive Statistics, Probability, Discrete Probability Distribution, Correlation, and Regression. On the mathematical side, the course introduces Matrix operations, Determinants, and the initial concepts of Calculus.

Learning Objectives:

LO1. To develop the student's ability to deal with numerical and quantitative issues in business.

LO2. To enable the use of statistical, graphical and algebraic techniques wherever relevant.

LO3. To have a proper understanding of Statistical applications in Economics and Management.

Course Outcomes:

CO1. Describe and discuss the key terminology, concepts tools and techniques used in business statistical analysis.

CO2. Critically evaluate the underlying assumptions of analysis tools.

CO3. Understand and critically discuss the issues surrounding sampling and significance.

CO4. Discuss critically the uses and limitations of statistical analysis.

CO5. Solve a range of problems using the techniques covered.

CO6. Conduct basic statistical analysis of data.

Unit No.	Unit Name	Topics	Nos. of lectures
1	**Statistical Data and Descriptive Statistics**	**Nature and Classification of Data:** qualitative and quantitative data; primary data and secondary data; four types of scale data; discreet and continuous data; univariate, bivariate and multivariate data; time-series data; spatial data,	10

		longitudinal data, spatiotemporal data; and cross-sectional data. **Shapes of Distributions:** ● Measures of Central Tendency. ● Mathematical averages including arithmetic mean, geometric mean and harmonic mean. Properties and applications. ● Positional Averages Mode and Median (and other partition values including quartiles, deciles, and percentiles) (including graphic determination). ● Measures of Variation: absolute and relative. Range, quartile deviation, mean deviation, standard deviation, and their coefficients, Properties of standard deviation/variance. ● The idea of Moments, Skewness: Meaning, Measurement using Karl Pearson and Bowley's measures; Concept of Kurtosis.	
2	**Probability and Discrete Probability Distributions**	**Theory of Probability:** ● Definition of probability. ● Total and compound probability. ● Conditional probability and Bayes' Theorem with application. ● Expectation and variance of a random variable. **Discrete Probability Distribution:** ● Probability mass function and its properties. ● Binomial distribution: mean, standard deviation and application. ● Poisson distribution: mean, standard deviation and application.	14
3	**Simple Correlation and Regression Analysis**	**Correlation Analysis:** ● Scatter Diagram. ● Pearson's coefficient of correlation. ● Spearman rank correlation. **Regression Analysis:** ● Principle of least squares and regression lines. ● Regression equations and estimation.	10

		• Properties of regression coefficients. • Relationship between correlation and regression coefficients.	
4	**Matrices and Determinants**	• Algebra of matrices. • Matrix Operation. • Inverse of a matrix and its application. • Solution of system of linear equations (having unique solution and involving not more than three variables) using matrix inversion Method and Cremer's Rule.	6
5	**Calculus I**	• Mathematical functions and their types: linear, quadratic, polynomial, exponential and logarithmic functions. • Limit and continuity of a function. • Concept and rules of differentiation (upto second order). • Application of differentiation: rate measure, slope, increasing and decreasing functions, maxima and minima. • L'Hospital rule ($\frac{\infty}{\infty}, \frac{0}{0}$ forms)	12

SUGGESTED TEXT BOOKS/ READING MATERIALS:

- J. Chakrabarti. Business Mathematics and Statistics- I. Dey Book Concern.
- Levin, Richard, David S. Rubin, Sanjay Rastogi, and HM Siddiqui. Statistics for Management. 7th ed., Pearson Education.
- Goon, Gupta and Dasgupta, Fundamentals of Statistics, Vol. I. World Press Private Limited.
- N. G. Das Statistical Methods. McGraw Hill Education.
- J.K. Sharma, Business Statistics, Vikas.
- Vohra N. D., Business Statistics, McGraw Hill Education.
- Murray R Spiegel, Larry J. Stephens, Narinder Kumar. Statistics (Schaum's Outline Series), McGraw Hill Education.
- Gupta. S.C. Fundamentals of Statistics. Himalaya Publishing House.
- Anderson, Sweeney. and Williams, Statistics for Students of Economics and Business, Cengage Learning.