

Paper BC 2.3. BUSINESS MATHEMATICS AND STATISTICS**Duration: 2.5 hrs Total Marks: 60(Term end examination 56 (Marks for Attendance 4)****Lectures: 65****Objective:** *The objective of this course is to familiarize students with the applications of mathematics and statistical techniques in business decision-making.***Notes:**

1. Use of simple calculator is allowed.
2. Proofs of theorems / formulae are not required.
3. Trigonometric functions are not to be covered.

Part – A: Business Mathematics**Unit 1: Matrices and Differential Calculus**

- a. Definition of a matrix. Types of matrices; Algebra of matrices. Calculation of values of determinants up to third order; Adjoint of a matrix; Finding inverse of a matrix through adjoint; Applications of matrices to solution of simple business and economic problems
- b. Mathematical functions and their types – linear, quadratic, polynomial; Concepts of limit and continuity of a function; Concept of differentiation; Rules of differentiation – simple standard forms. Applications of differentiation – elasticity of demand and supply; Maxima and Minima of functions (involving second or third order derivatives) relating to cost, revenue and profit.

Unit 2: Basic Mathematics of Finance

Simple and compound interest Rates of interest – nominal, effective and continuous – their interrelationships; Compounding and discounting of a sum using different types of rates

Part – B: Business Statistics**Unit 1: Uni-variate and Bi-variate Analysis**

- a. Measures of Central Tendency including arithmetic mean, geometric mean and harmonic mean: properties and applications; mode and median. Partition values - quartiles, deciles, and percentiles. Measures of Variation: absolute and relative. Range, quartile deviation and mean deviation; Variance and Standard deviation: calculation and properties.

- b. Simple Linear Correlation Analysis: Meaning, and measurement. Karl Pearson's coefficient and Spearman's rank correlation

Simple Linear Regression Analysis: Regression equations and estimation. Relationship between correlation and regression coefficients

Unit 2: Time-based Data: Index Numbers and Time-Series Analysis

- a. Meaning and uses of index numbers; Construction of index numbers: Aggregative and average of relatives – simple and weighted, Tests of adequacy of index numbers, Construction of consumer price indices.
- b. Components of time series; additive and multiplicative models; Trend analysis: Finding trend by moving average method and Fitting of linear trend line using principle of least squares.

Unit V and Unit IV (For Internal Assessment)**Tutorials**

Analysis of case studies based on syllabi of Unit I to Unit IV/ Assignments based on field survey/subject tours wherever feasible/Quiz programmes/moot courts wherever feasible/class presentations/class room seminars/Group discussions

Suggested Readings:

1. Mizrahi and John Sullivan. *Mathematics for Business and Social Sciences*. Wiley and Sons.
2. Budnick, P. *Applied Mathematics*. McGraw Hill Publishing Co.
3. N. D. Vohra, *Business Mathematics and Statistics*, McGraw Hill Education (India) Pvt Ltd
4. J.K. Thukral, *Mathematics for Business Studies*, Mayur Publications
5. J. K. Singh, *Business Mathematics*, Himalaya Publishing House.
6. J. K. Sharma, *Business Statistics*, Pearson Education.
7. S.C. Gupta, *Fundamentals of Statistics*, Himalaya Publishing House.
8. S.P. Gupta and Archana Gupta, *Elementary Statistics*, Sultan Chand and Sons, New Delhi.
9. Richard Levin and David S. Rubin, *Statistics for Management*, Prentice Hall of India, NewDelhi.
10. M.R. Spiegel, *Theory and Problems of Statistics*, Schaum's Outlines Series, McGraw HillPublishing Co.

Journals:

1. Journal of Applied Quantitative Methods
2. International Journal of Operations and Quantitative Management

