Business Mathematics-II

Full Marks: 100
Teaching Hours:150

I. Introduction

The syllabus of Business Mathematics for Grade XI is designed to equip the students with mathematical and statistics concepts applicable in business and economics. The course further aims at providing the students with a base for higher education in management, economics and other business related fields.

II. General Objectives

The general objectives of this course are:

a. to familiarize the students with finite mathematics and business mathematics,
b. to acquaint the students with necessary mathematics and statistical tools to be used in decision making business and economics, and
c. to provide a basic learning resource for further study of quantitative method.

III Specific Objectives

Upon the completion of this course, the students will be able to:

1. understand finite mathematics relevant to the concept of system as group of related entitles;
2. get some idea about arrangement of numbers
3. get elementary knowledge of Co-ordinate Geometry;
4. use rudimentary concept of logarithms in numerical simplification;
5. apply differential and integral calculus in studying the dynamics of system behaviour;
6. describe the concepts basics to linear programming problem (LPP) and apply them in optimizing situations in business;
7. use basic tools of statistics in business and economics;
8. understand the basic concepts of probability;
9. understand and solve the problem of business and finance.

IV. Course Scheme

Units	Chapters	Teaching hours	% of weightage
1.	Number System	7	4.67
2.	Sets and Relations	7	4.67
3.	Sequence and Series	7	4.67
4.	Permutation and Combination	5	3.33
5.	Matrics and Determinants	12	8
6.	Co-ordinate Geometry	9	6
7.	Logarithms	6	4
8.	Functions, Limits and Continuity	10	6.66
9.	Differentiation	10	6.66
10.	Application and Derivatives	6	4
11.	Integration	9	6
12.	Linear Programming Problem	7	4.67
13.	Measures of Dispersion	12	8
14.	Probability	6	4
15.	Mathematics of Gain and Loss	15	10
16.	Mathematics of Finance	22	14.67
	Total Teaching Hours	150	100

V. Course Contents

Unit 1. Number system 7 teaching hours

- Review of system of Natural numbers, Integers, Rational and Irrational numbers, Real numbers
- Concept of inequalities and their properties
- Absolute values and their properties(verification only)

- Complex numbers and their properties (verification only)

Unit 2. Sets and Relations 7 teaching hours

- Review of sets, Euler-Venn diagram and operation on set.
- Properties of algebra of sets and their verification only(without theoretical proof)
- Number of elements in a set and the problems relating up to 3 sets
- Cartesian product of two sets, Relation and function, Domain and range (Excluding types of function, inverse and composite functions)

Unit 3. Sequence and Series 7 teaching hours

- Difference between sequence, series and progression
- Finite and infinite series
- Types of progression (A.P., G., P. and H.P.)
- n^{th} term of an A.P,. sum of n terms of the series in A. P., Arithmetic means
- nth term of an G.P., sum of the n terms of the series in G.P., sum of an infinite series in G.P., Geometric means, sum of the n terms of the series reducible to G.P. of the type 4 + 44 + 444 + … (excluding sum to n terms of the type 1+ 4 + 13 + 40 + …)

Unit 4. Permutation and Combination 5 teaching hours

- Basics principles of counting
- Meaning of nPr
- Permutation of things when some are alike (simple cases only)
- Meaning of nCr, problems relating to combination (simple cases only) (Avoid the problem relating to restricted permutation like "two things arranged together", not arranged together)

Unit 5. Matrices and Determinants 12 teaching hours

- Matrix and its size
- Types of matrices
- Algebra of matrices
- Determinants and its evaluation up to third order
- Properties of determinants (without proof)
- Solving simultaneous equations of two and three variables by using Carmer's rule, solution of verbal problems of two variables only.

Unit 6. Co- ordinate Geometry 9 teaching hours

- Rectangular coordinates system
- Slope of a straight line joining two points
- Distance between two points
- Coordinates of a point dividing a line joining two points in a given ration
- Locus and equation
- Equation of a straight line in slope-intercept from, double intercept from, double intercepts from, points slope form and two straight line
- The points of intersection of two straight lines.

Unit 7 Logarithms 7 teaching hours

- Logarithm and its basic properties, change of base
- Common logarithm table , use of common logarithm table in finding logarithm of number
- Antilog table, finding antilog of logarithm of a number

Unit 8. Functions Limit and continuity 10 teaching hours

- Constant and variable
- Definition not notation of Function
- Types of function and its graphic representation
- Computation of functional values
- Application of functions to Commerce and Economics
- An intuitive idea of Limit at infinity
- Concepts of continuity and discontinuity (Note: Algebra only)

Unit 9. Differentiation 10 teaching hour

- Definition and notation of derivatives
- Geometrical meaning of derivatives
- Differentiation of a function by first principle of algebraic function only.
- Methods of differentiation
- Differentiation of implicit function and parametric function
- Second order derivatives
- Second order derivatives
  (Note: Derivative of a algebraic, logarithmic and exponential functions only)

Unit 10. Application of Derivatives 6 teaching hours

- Application of derivative to Commerce and Economics
- Increasing and decreasing function point of inflection

- Maximum and minimum of a function and application (Algebraic only)

Unit 11 Integration

- Integration as an inverse process of Differentiation
- Methods of Integration by substitution and by parts
- Concept of Definite Integral
- Methods of evaluating Definite Integrals
- Application of integration to Commerce and Economics
  (Note: Anti – derivation of algebraic. logarithmic and exponential functions only)

Unit 12 Linear Programming Problem 7 teaching hours

- Liner inequality in two variables and its graphical solution
- System of liner inequalities in two and its graphical solution
- Meaning of L.P.P and its importance
- Constraints, Objective function, Optimization
- Mathematical Formulation of L.P.P.
- Graphic method of solving L.P.P.

Unit 13. Measure of Dispersion 12 teaching hours

- Review of measures of Central Tendency
- Range, Quartile deviation, Mean deviation and Standard deviation and their relative measures.

Unit 14. Probability 6 teaching hours

- Review of measures of Central Tendency
- Range, Quartile deviation, Mean deviation and Standard deviation and their relative measures.

Unit 15 Mathematics of Gain and Loss 15 teaching hours

- Ratio and proportion
- Profit and Loss
- Partnership

Unit 16 Mathematics of Finance 22 teaching hours

- Money and Exchange (Chain method)
- Present worth and Discount
- Compound interest and Compound Depreciation
- Annuity and its terminology:
  (a) Immediate Annuity and computation of Amount, Present value only
  (b) Annuity due and computation of Amount, Present value only (excluding deferred cases)

Evaluation Scheme:

Units	Titles	Short answer question	Marks	Long answer question	Marks	Total
1.	Number System	1	1x3=3	-	-	3
2.	Sets and Relations	1	1x3=3	-	-	3
3.	Sequence and Serise	2	2x3=6	-	-	6
4.	Permutation and Combination	1	1x3=3	-	-	3
5.	Matrics & Determinants	1	1x3=3	1	1x5=5	8
6.	Co-ordinate Geometry	2	2x3=6	-	-	6
7.	Logarithms	1	1x3=3	-	-	3
8.	Function, Limit and Continuity	2	2x3=6	-	-	6
9.	Differentiation	1	1x3=3	1	1x5=5	8
10.	Application and Derivatives	-	-	1	1x5=5	5
11.	Integration	2	2x3=6	-	-	6
12.	Linear Programming Problem	-	-	1	1x5=5	5
13.	Measures of Dispersion	1	1x3=3	1	1x5=5	8
14	Probability	1	1x3=3	-	-	3
15.	Mathematics of Gain and Loss	2	2x3=6	1	1x5=5	11
16.	Mathematics of Finance	2	2x3=6	1	2x5=10	16
	Total	20	60	8	40	100