COMPREHENSIVE SYLLABUS

BASIC MATHEMATICS

UNIT I : ALGEBRA (42 hrs)

CHAPTER 1. MATRICES AND DETERMINANTS (13 hrs)

1.1. Introduction
1.2. Matrices
1.3. Types of Matrices
1.4. Algebra of Matrices
1.5. Determinants
1.6. Expansion or evaluation of a determinant
1.7. Properties of Determinants
1.8. Solution of Linear Equations – (Cramer's Rule / det method)
1.9. Minors and Cofactor and Adjoint of a square matrix
1.10 Singular and non-singular Matrices
1.11. Inverse of a Matrix
1.12. Solution of system of Linear Equations by Matrix method
1.13. Application Problems to Commerce

CHAPTER 2. PERMUTATIONS AND COMBINATIONS (08 hrs)

2.1. Introduction
2.2. The Factorial
2.3. Fundamental Principle of Counting
2.4. Permutation vs. Combination
2.5. Permutations
2.6. Types of Permutations
2.7. Circular Permutations
2.6. Combinations

CHAPTER 3. PROBABILITY (05 hrs)

3.1. Introduction
3.2. Definitions and some important terms
3.3. Three systematic approach
3.4. Classical or Mathematical approach

3.5. Addition Theorem
3.6. Conditional Probability
3.7. Multiplication theorem

CHAPTER 4. BINOMIAL THEOREM (06 hrs)

4.1. Introduction
4.2. Binomial Theorem
4.3. General Term in the Binomial Expansion
4.4. Middle Term in the Binomial Expansion
4.5. Term independent of 'x' in the Binomial Expansion
4.6. Co-efficient of a particular power of x in the Binomial Expansion
4.7. Application Problems

CHAPTER 5 PARTIAL FRACTIONS (04 hrs)

5.1. Introduction
5.2. Rational Fractions
5.3. Proper and Improper Fractions
5.4. Reduction of Improper Fraction to the sum of a polynomial and a proper rational fraction
5.5. Partial Fractions

CHAPTER 6. MATHEMATICAL LOGIC (06 hrs)

6.1. Introduction
6.2. Proportion and Truth Values
6.3. Logical Connectives
6.4. Tautology and Contradiction
6.5. Logical Equivalences
6.6. Converse, Inverse and Contra positive of a conditional

UNIT II: COMMERCIAL ARITHMETIC (34 hrs)

CHAPTER 7. RATIO AND PROPORTIONS (10 hrs)

7.1. Introduction
7.2. Ratio
7.3. Porporation
7.4. Properties of Proportions
7.5. Time and Work, Time and Distance and Mixtures

CHAPTER 8. BILL DISCOUNTING (06 hrs)

8.1. Bill of Exchange

8.2. Discount Date
8.3. Discount Period
8.4. Discount Rate
8.5. True Present Value
8.6. Discount (i) True Discount (ii) Banker's Discount
8.7. Banker's Gain
8.8. Discounted Value of the Bill

CHAPTER 9. STOCKS AND SHARES (04 hrs)
9.1. Introduction
9.2. Definition of a Stock
9.3. Nominal Interest (or Dividend)
9.4. Yield
9.5. Brokerage

CHAPTER 10. LEARNING CURVE (04 hrs)
10.1. Introduction
10.2. Learning Curve
10.3. Learning Curve Ratio
10.4. Learning Effect
10.5. Learning Curve Equation

CHAPTER 11. LINEAR PROGRAMMING PROBLEMS (LPP) (06 hrs)
11.1. Introduction
11.2. Definition of Linear Programming
11.3. Formulation of Linear Programming
11.4. Graphical Solutions for Linear Programming Problems

CHAPTER 12. SALES TAX AND VALUE ADDED TAX (04 hrs)
12.1. Introduction
12.2. Sales Tax (ST)
12.3. Value Added Tax (VAT)

UNIT III: TRIGONOMETRY (12 hrs)

CHAPTER 13. HEIGHTS AND DISTANCES (4 hrs)
13.1. Introduction
13.2. Angle of Elevation and Angle of Depression

CHAPTER 14. COMPOUND ANGLES, MULTIPLE ANGLES, SUBMULTIPLE ANGLES & TRANSFORMATION FORMULAE **(8 hrs)**

14.1. Introduction
14.2. Trigonometrically Ratios of Compound Angles
14.3. Multiple Angles
14.4. Sub multiple Angles
14.5. Transformation Formulae

UNIT IV : ANALYTICAL GEOMETRY **(10 hrs)**

CHAPTER 15. CIRCLES **(6 hrs)**

15.1. Introduction
15.2. Definition and Equation of a circle in different forms.
15.3. General Equation of a Circle
15.4. Length of the Chord of the Circle
15.5. Points of Intersection of a line and a circle (chords and tangents)

CHAPTER 16. PARABOLA **(4 hrs)**

16.1. Introduction to Conic Section - Parabola
16.2. Definition of Parabola and other forms of Parabola
16.3. Four Standard forms of Parabola and their Graphs

UNIT V: CALCULUS (42 hrs)

CHAPTER 17. LIMIT AND CONTINUITY OF A FUNCTION **(6 hrs)**

17.1. Introduction
17.2. Variables and Constants
17.3. Definition of a Function
17.4. Types of Functions
17.5. Limit of a Function
17.6. Algebra of Limits
17.7. Evaluation of Limits
17.8. Evaluation of Standard Limits
17.9. Statement of some Standard Limits
17.10. Limit at Infinity and Infinite Limits
17.11. Left Hand and Right Hand Limits
17.12. Continuity of a Function

CHAPTER 18. DIFFERENTIAL CALCULUS **(10 hrs)**

18.1. Introduction

18.2. Increment
18.3. Derivative of a Function
18.4. Derivative at a point
18.5. Differentiability
18.6. Relation between Continuity and Differentiability
18.7. Differentiation by the method of first principles
18.8. Algebra of Derivatives of Functions
18.9. Composite Functions
18.10. Differentiation of Implicit Functions
18.11. Derivatives of Infinite Series
18.12. Logarithmic Differentiation
18.13. Differentiation of Parametric functions
18.14. Second order Derivatives

CHAPTER 19. APPLICATION OF DERIVATIVES (8 hrs)

19.1. Introduction
19.2. Derivative as a Rate Measure
19.3. Increasing and Decreasing functions
19.4. Maxima and Minima
19.5. Total cost, Average cost and Marginal Cost
19.6. Total Revenue, Average Revenue and Marginal Revenue

CHAPTER 20. INDEFINITE INTEGRALS (8 hrs)

20.1. Introduction
20.2. Primitive and Antiderivative
20.3. Indefinite Integral
20.4. Standard Integrals
20.5. Properties of Indefinite Integrals
20.6. Integration by Substitution
20.7. Integration by Partial Fractions
20.8. Integration by Parts

CHAPTER 21. DEFINITE INTEGRAL AND ITS APPLICATIONS TO AREAS (8 hrs)

21.1. Fundamental theorem of Integral Calculus
21.2. Application of Definite Integrals to area bonded by curves and lines with axes
21.3. Area between curves
21.4. Application of Definite Integrals to cost and revenue functions