

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