

**JYOTI NIVAS COLLEGE AUTONOMOUS
SYLLABUS FOR 2018 BATCH AND THEREAFTER**

Programme: B.C.A

Semester: I

MATHEMATICAL FOUNDATION FOR COMPUTER SCIENCE - I

Course Code: 18BCAIT1

No. of Hours: 60

COURSE OBJECTIVES:

- Capable of inquiring and understanding a wide range of concepts in mathematics.
- Able to understand the algebraic concepts of mathematics in sets, relations, functions, groups and Matrices.
- Able to understand the concepts of analytical geometry and vectors.
- To understand the basic notions of symbolic logic.

LEARNING OUTCOMES:

- To relate and solve real life problems using the concepts of sets, relations and functions.
- Analyse propositions and arguments in logic using truth tables.
- Formulate and solve system of linear equations by Matrix method and Cramer's Rule
- Explain the significance of Eigen values and their Eigen vectors and to compute them.
- Assess properties implied by the definitions of groups and sub groups.
- Relate and integrate analytical geometry and vectors into real life contexts as well as into other disciplines.

UNIT I

10 HRS

Sets: Sets, Subsets, Equal sets, Universal sets, Finite and Infinite sets, Union, Intersection and Complement of sets, Cartesian product, cardinality of a set, De-Morgan's Laws(with proof).

Relations: Properties of relations, Equivalence Relation

Functions: Types of functions, Composite and Inverse functions.

(Illustrative examples and problems)

UNIT II

05 HRS

Mathematical Logic: Proposition and Truth Values, Logical Connectives and their truth tables, Converse, Inverse and Contra positive, Tautology and Contradiction, Logical Equivalence.

Normal forms: Disjunctive normal forms, Conjunctive normal forms, Principal Disjunctive normal forms and Principal Conjunctive normal forms.

UNIT III

15 HRS

Matrices: Review of fundamentals: Definition of a Matrix, order, Types of matrices: Zero, row, column, square, diagonal, scalar, unit, symmetric, skew-symmetric. Determinant: Value of determinant of order 2×2 , 3×3 , minors, cofactors, adjoint, inverse of a matrix. Finding solutions of linear equations: Cramers Rule and Matrix method involving two and three variables. Eigen values and Eigen vectors(without any theorems) only of order 2×2 matrices. Cayley Hamilton theorem (only statement) – Verification of Cayley Hamilton theorem (only for 2×2 matrices), Inverse of a matrix using Cayley- Hamilton theorem.(only for 2×2 matrices)

UNIT IV**15 HRS**

Groups: Binary operation, Definition of a group, properties, problems (both finite and infinite groups), subgroups & theorems.

Vectors: Definition of vector and scalar, vector addition, dot and cross product, projection of a vector on the other vector, area of parallelogram, area of a triangle, scalar triple product, volume of parallelepiped, vector triple product. (only Problems)

UNIT V**15 HRS**

Analytical Geometry in Two Dimensions: Coordinates, Distance formula, Section Formula, Area of the Triangle formula (no derivation), Locus of point. **Straight Line:** Slope of a line and angle between two lines, Various forms of equations of lines – Derivation and Problems. Equation of a line passing through the point of intersection of two lines, Distance of a point from a line (only problems).

REFERENCES:

1. Grewal, B.S.Higher engineering Mathematics, 36th Edition
2. Satyrs S.S, Engineering Mathematics.
3. Peter V.O'Neil. Advanced Engineering Mathematics, 5th Edition.