**MATHEMATICS**

**MID – 1 SYLLABUS**

**SEMESTER - I**

**PAPER – 1 DIFFERENTIAL EQUATIONS**

UNIT – I

Differential Equations of first order and first degree : Linear Differential Equations; Differential Equations Reducible to Linear Form; Exact Differential Equations; Integrating Factors; Change of Variables.

UNIT – III

Higher order linear differential equations-I : Solution of homogeneous linear differential equations of order n with constant coefficients; Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators. General Solution of f(D)y=0 General Solution of f(D)y=Q when Q is a function of x. ) ( 1 f D is Expressed as partial fractions. P.I. of f(D)y = Q when Q= ax be P.I. of f(D)y = Q when Q is b sin ax or b cos ax

UNIT – IV :

Solution of the non-homogeneous linear differential equations with constant coefficients.

P.I. of f(D)y = Q when Q= b

P.I. of f(D)y = Q when Q= V

**SEMESTER - III**

**PAPER – 3 ABSTRACT ALGEBRA**

UNIT – 1 :

GROUPS : - Binary Operation – Algebraic structure – semi group-monoid – Group definition and elementary properties Finite and Infinite groups – examples – order of a group. Composition tables with examples.

UNIT – 2 :

SUBGROUPS : - Complex Definition – Multiplication of two complexes Inverse of a complex-Subgroup definition – examples-criterion for a complex to be a subgroups. Criterion for the product of two subgroups to be a subgroup-union and Intersection of subgroups. Co-sets and Lagrange’s Theorem :- Cosets Definition – properties of Cosets–Index of a subgroups of a finite groups–Lagrange’s Theorem.

UNIT –3 :

NORMAL SUBGROUPS : - Definition of normal subgroup – proper and improper normal subgroup–Hamilton group – criterion for a subgroup to be a normal subgroup – intersection of two normal subgroups – Sub group of index 2 is a normal sub group.

**SEMESTER – V**

**RING THEORY & VECTOR CALCULUS-V(A)**

UNIT – 1

RINGS-I : - Definition of Ring and basic properties, Boolean Rings, divisors of zero and cancellation laws Rings, Integral Domains, Division Ring and Fields, The characteristic of a ring - The characteristic of an Integral Domain, The characteristic of a Field. Sub Rings, Ideals

UNIT – 2

RINGS-II : -Definition of Homomorphism – Homorphic Image – Elementary Properties of Homomorphism – Kernel of a Homomorphism – Fundamental theorem of Homomorhphism – Maximal Ideals – Prime Ideals.

UNIT – 3 VECTOR DIFFERENTIATION:

Vector differentiation, Ordinary derivatives of vectors, Differentiability, Gradient and directional derivative, angle between two surfaces 4(a),4(b),5(a) (Exercise) only

**SEMESTER – V**

**LINEAR ALGEBRA PAPER - V(B)**

UNIT – I

Vector Spaces-I : Vector Spaces, General properties of vector spaces, n-dimensional Vectors, addition and scalar multiplication of Vectors, internal and external composition, Null space, Vector subspaces, Algebra of subspaces, Linear Sum of two subspaces, linear combination of Vectors, Linear span Linear independence and Linear dependence of Vectors.

UNIT –II

Vector Spaces-II : Basis of Vector space, Finite dimensional Vector spaces, basis extension, co-ordinates, Dimension of a Vector space, Dimension of a subspace, Quotient space and Dimension of Quotient space.

UNIT-III Linear Transformations :

Linear transformations, linear operators, Properties of L.T, sum and product of L.Ts, Algebra of Linear operators.