

CORE COURSE I - ALGEBRA

UNIT I

GROUP THEORY: A counting principle – Normal Subgroups and Quotient groups – Homomorphism – Cayley’s theorem – Permutation groups – Another counting principle – Sylow’s theorems.

UNIT II

RING THEORY : Homomorphism of rings – Ideals and quotient rings – More ideals and quotient rings – Polynomial rings – Polynomials over the rational field – polynomials over commutative rings.

UNIT III

MODULUS: Inner Product Spaces – Orthogonal complement – Orthogonal Basis – Left Module over a Ring – Sub module – Quotient Module – Cyclic Module – Structure theorem for finitely generated Modules over Euclidean Rings.

UNIT IV

FIELDS : Extension fields – Roots of Polynomials – More about roots - The elements of Galois theory – Finite fields.

UNIT V

TRANSFORMATIONS: Triangular form – Hermitian, Unitary and Normal transformations

TEXT BOOK(S)

- [1] I.N. Herstein, Topics in Algebra, Second Edn, Wiley Eastern Limited.
 - UNIT – I - Chapter II : Sec 2.5, 2.6, 2.7, 2.10, 2.11, 2.12
 - UNIT – II - Chapter III : Sec 3.3, 3.4, 3.5, 3.9, 3.10, 3.11
 - UNIT – III - Chapter IV : Sec 4.1, 4.2, 4.3, 4.4, 4.5
 - UNIT – IV - Chapter V : Sec 5.1, 5.3, 5.5, 5.6 and Chapter VII: Sec 7.1
 - UNIT – V - Chapter VI : Sec 6.4, 6.5 and 6.10

REFERENCE BOOK(S)

- [1] Surjeet Singh, Qazi Zameeruddin, Modern Algebra, Vikas Publishing House Pvt Ltd.
- [2] John, B. Fraleigh, A First Course in Abstract Algebra, Addison-Wesley Publishing company.
- [3] Vijay, K. Khanna, and S.K. Bhambri, A Course in Abstract Algebra, Vikas Publishing House Pvt Limited,