**Algebra**

*Topics:*

1. Groups: Groups, subgroups, normal subgroups, cosets, quotient groups, Lagrange’s theorem, cyclic groups, homomorphisms, isomorphism theorems, symmetric, alternating and dihedral groups, direct products, finitely generated abelian groups, action of a group on a set, Sylow theorems.
2. Rings: Rings, subrings, homomorphisms, ideals, prime and maximal ideals, quotient rings, isomorphism theorems for rings, direct products and Chinese remainder theorem, factorization in commutative rings, unique factorization domains, Euclidean domains, polynomial rings, factorization in polynomial rings.
3. Fields: Field extensions: algebraic and transcendental extensions, simple extensions and their characterization, Galois extensions and the fundamental theorem of Galois theory, splitting fields, algebraic closure, separability, normality, fundamental theorem of Galois theory, structure of finite fields.

*Suggested Books:*

* Algebra: T. W. Hungerford
* Algebra: S. Lang
* Abstract Algebra: D. S. Dummit, R. M. Foote