MA 408: Abstract Algebra (3-1-0:4)

Groups:binary operation and its properties, definition of a group, examples and basic properties. Subgroups, cosets and Lagrange's theorem. Cyclic groups and generators, order of a group. Normal subgroups, quotient group. Homomorphisms, kernel and image of a homomorphism, isomorphisms and automorphisms.

Group Actions and Applications:permutation groups, Cayley's theorem, direct product of groups, group action on a set, semi-direct product, Sylow's theorems, structure of finite abelian groups, applications, some nontrivial examples.

Rings:definition and basic concepts in rings, examples and basic properties, zero divisors, integral domains, fields, characteristic of a ring, quotient field of an integral domain, subrings, ideals, maximal ideal, prime ideal, definition and examples, quotient rings, isomorphism theorems.

Fields:ring of polynomials, prime, irreducible elements and their properties. Eisensteins irreducibility criterion and Gauss's lemma. UFD, PID and Euclidean domains. Ring of polynomials over a field, field extensions, algebraic and transcendental elements, algebraic extensions, splitting field of a polynomial, algebraic closure of a field.

Text Books and References:

1. I. N. Herstein, "Topics in Algebra",Wiley India Pvt. Limited
2. D. S. Dummit and R. M. Foote, "Abstract Algebra",Wiley India Pvt. Limited.
3. J. B. Fraleigh, "A First Course in Abstract Algebra", Pearson Education.
4. J. A. Gallian, "Contemporary Abstract Algebra",Cengage.
5. N. Jacobson,"Basic Algebra",Vol. 1&2, Dover Publications Inc.