

SYLLABUS

M.A. /M.Sc. MATHEMATICS (PREVIOUS) 2010-2011

Note: There will be five papers in all and all papers are compulsory. Each paper will be assigned six hours per week.

PAPER-I ADVANCED ABSTRACT ALGEBRA

TIME: 3 hours

Max. Marks: 100

UNIT-I

External and Internal direct product of two and finite number of subgroups; Commutator subgroup; Cauchy's theorem for finite abelian and non abelian groups, sylow's three theorem and their easy applications, Subnormal and Composition series, Zassenhaus lemma and Jordan Holder theorem.

UNIT-II

Solvable groups and their properties, Nilpotent groups, Fundamental theorem for finite abelian groups, Annihilators of subspace and its dimension in finite dimensional vector space, Invariant, Projection, adjoints, Singular and nonsingular linear transformation, quadratic forms and Diagonalization.

UNIT-III

Prime fields of characteristic zero and of prime number, Polynomial rings, Factorization theory in Integral domain, Prime and irreducible elements, Greatest common divisor and least common multiple, Euclidean domain, Principle ideal domain and Unique Factorization domain and their related theorems, Product of ideals and nilpotent ideals.

UNIT-IV

Definition and examples of Modules, sub module, Factor (Quotient) Module, Sub module generated by a set, Sum and direct sum of two sub modules, Homomorphism and isomorphism, Three isomorphism theorems in modules, simple, and cyclic and Finitely generated module, Fundamental theorem on finitely generated modules over Euclidean rings, Noetherian and artinian modules, Hilbert basis theorem.

UNIT-V

Field extension: finite and infinite, examples, Algebraic and transcendental extensions, Splitting field Separable and inseparable extensions, Normal Extensions, Perfect fields, Finite fields, primitive elements, Automorphisms, Galois theory of field extensions and its fundamental theorem, Solution of polynomial equations by radicals, Abel's theorem.

Books recommended:

1. Surjeet Singh and Quazi Zameeruddin : Modern Algebra
2. I.N.Herstein : Topics in algebra
3. R.S.Agrawal : Algebra
4. N. Jacobson : Basic Algebra Vol. I, II
5. S. Lang : Algebra IIIrd Edition
6. P.B. Bhattacharya : Basic Abstract Algebra (IInd Edition)
S.K. Jain and Etc.