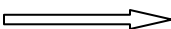


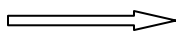
**M.A/M.Sc Mathematics Semester 1<sup>st</sup>**

**Effective from academic session 2010**  **Repetition for 2012 with minor change**

S.No	Subject Code	Subject Name	Theory		Internal	
			Max	Min.	Max	Min
1	MM-CP-101	Abstract Algebra-I	80	32	20	08
2	MM-CP-102	Real Analysis-I	80	32	20	08
3	MM-CP-103	Complex Analysis -I	80	32	20	08
4	MM-CP-104	Methods of Applied Mathematics-I	80	32	20	08
5	MM-CP-105	Topology	80	32	20	08

**M.A/M.Sc Mathematics Semester 1<sup>st</sup>**

**Effective from academic session 2010**



**Repetition for 2012 with minor change**

**ADVANCED ABSTRACT ALGEBRA-I**

**Course No. MM-CP-101**

**Unit I**

Definitions and Examples of Semi-groups and Monoids, Criteria for the semi-groups to be a group. Cyclic groups. Structure theorem for cyclic groups. Endomorphism, Automorphism, Inner Automorphism and Outer Automorphism, Center of a group, Cauchy's and Sylow's theorem for abelian groups. Applications of Sylow theory, Groups of order  $2n$ ,  $n$  as odd prime, groups of order  $p^2$ ,  $pq$ . Permutation groups, Symmetric groups, Alternating groups, Simple groups, Simplicity of the Alternating group  $A_n$  for  $n \geq 5$ .

**Unit II**

Normalizer, conjugate classes, Class equation of a finite group and its applications, Cauchy's theorem, Sylow's theorem. Double cosets, Second and third parts of Sylow's theorem. Direct product of groups, Finite abelian groups, normal and subnormal series, Composition series. Jordan Holder theorem for finite groups. Zassenhaus Lemma, Schreier's Refinement theorem, Solvable groups and Nilpotent groups.

**Unit III**

Brief review of Rings, Integral domain, Ideals. The field of quotients of an Integral domain. Euclidean rings with examples such as  $Z[\sqrt{-1}]$ ,  $Z[\sqrt{2}]$ , Principal ideal rings(PIR) Unique factorization domains(UFD), Relationships between Euclidean rings, P.I.R.'s and U.F.D. The Division algorithm for polynomials, Irreducible polynomials, Polynomials and the rational field, Primitive polynomials, Contract of a polynomials, Gauss Lemma, Integer monic polynomial, Eisenstein's irreducibility criterion, Polynomial rings and Commutative rings.

**Unit IV**

Canonical forms: Triangular form, Invariance, Invariant direct-sum decomposition, Primary decomposition, Nilpotent operators, Jordan canonical form, cyclic subspaces, Rational canonical form, Quotient spaces. Bilinear forms, Alternating Bilinear forms, Symmetric bilinear forms, quadratic forms, Law of inertia, Hermitian forms.

**Recommended Books:**

1. I.N.Herstein : Topics in Algebra.
2. K.S.Miller : Elements of Modern Abstract Algebra.
3. Surjeet Singh and Qazi Zameer-ud-din: Modern Algebra, Vikas Publishing House Private Limited.
4. P.B.,Bhattacharaya and S.K.Jain : Basic Abstract Algebra.
5. J.B. Fraleigh : A First Course in Abstract Algebra.
6. J.A.Gallian : Contemporary Abstract Algebra.