B.Sc. SECOND YEAR MATHEMATICS SYLLABUS

**SEMESTER – III, PAPER - 3**

**ABSTRACT ALGEBRA**

***UNIT – 1 : GROUPS : -***

Binary Operation – Algebraic structure – semi group-monoid – Group definition and elementary properties Finite and Infinite groups – examples – order of a group. Composition tables with examples.

***UNIT – 2 : SUBGROUPS : -***

Complex Definition – Multiplication of two complexes Inverse of a complex-Subgroup definition – examples-criterion for a complex to be a subgroup.

Criterion for the product of two subgroups to be a subgroup-union and Intersection of subgroups.

**Co-sets and Lagrange’s Theorem :-**

Cosets Definition – properties of Cosets–Index of a subgroups of a finite groups–Lagrange’s Theorem.

***UNIT –3 : NORMAL SUBGROUPS : -***

Definition of normal subgroup – proper and improper normal subgroup–Hamilton group – criterion for a subgroup to be a normal subgroup – intersection of two normal subgroups – Sub group of index 2 is a normal sub group – simple group – quotient group – criteria for the existence of a quotient group.

***UNIT – 4 : HOMOMORPHISM : -***

Definition of homomorphism – Image of homomorphism elementary properties of homomorphism – Isomorphism – automorphism definitions and elementary properties–kernel of a homomorphism – fundamental theorem on Homomorphism and applications.

***UNIT – 5 : PERMUTATIONS AND CYCLIC GROUPS : -***

Definition of permutation – permutation multiplication – Inverse of a permutation – cyclic permutations – transposition – even and odd permutations – Cayley’s theorem.

**Cyclic Groups :-**

Definition of cyclic group – elementary properties – classification of cyclic groups.

**Outcomes:**

* Students will go through the theoretical topics and can able to perform problems by such topics
* They gain knowledge that a Sub Group of index 2 is a Normal SubGroup.
* They learn about Permutations and different types in it and also about cyclic groups.
* The topics Group Theory And Ring Theory are useful in their Post Graduation and also for their NET,SET.