

Module Code: MATH-302
Module Title: **Group Theory -I**
Module Rating: 3 Cr. Hours

Groups

- Definition and examples of groups
- Abelian group
- Subgroups lattice, Lagrange's theorem
- Relation between groups
- Cyclic groups
- Groups and symmetries, Cayley's theorem

Complexes in Groups

- Complexes and coset decomposition of groups
- Centre of a group
- Normalizer in a group
- Centralizer in a group
- Conjugacy classes and congruence relation in a group
- Double cosets

Normal Subgroups

- Normal subgroups
- Proper and improper normal subgroups
- Factor groups
- Fundamental theorem of homomorphism
- Automorphism group of a group
- Commutator subgroups of a group

Sylow Theorems

- Cauchy's theorem for Abelian and non-Abelian group
- Sylow theorems

Recommended Books

1. J. Rose, *A Course on Group Theory*, (Cambridge University Press, 1978)
2. I. N. Herstein, *Topics in Algebra*, (Xerox Publishing Company, 1964)
3. P. M. Cohn, *Algebra*, (John Wiley and Sons, London, 1974)
4. P. B. Bhattacharya, S. K. Jain and S. R. Nagpaul, *Basic Abstract Algebra*, (Cambridge University Press, 1986)
5. J. B. Fraleigh, *A First Course in Abstract Algebra*, (Addison-Wesley Publishing Company, 2002)



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