

**Group Theory**

- Normal Subgroups and Quotients, Cosets, Center, Commutant etc.
- Abelian Groups, Free Abelian Groups, Finitely Generated Abelian Groups
- Finite Groups. Sylow Theorems
- Free Groups
- Some Special Classes of Groups (Nilpotent, Solvable, Amenable etc.)
- Introduction to Representation Theory

**Rings and modules**

- Factorization in Commutative Rings
- Rings of Quotients and Localization
- Rings of Polynomials
- Free, Projective and Injective Modules
- Exact Sequences, HOM and Tensor Products
- Introduction to Homological Algebra

**Reference:**

T. W. Hungerford, *Algebra*, GTM73, Springer, 2003