



Code	Subject Title	Cr. Hrs	Semester
MATH-204	Mathematics B-IV [Metric Spaces & Group Theory]	4	IV
Year	Discipline		
2	Mathematics-I,II		

**Metric Spaces**

- Definition and various examples of metric spaces
- Holder's inequality, Cauchy-schwarz and minkowski's inequality
- Open and closed balls
- Neighborhoods
- Open and closed sets
- Interior, Exterior and boundary points
- Limit points, Closure of a set
- Convergence in metric spaces, Cauchy sequences
- Continuity in metric spaces
- Inner product and norm
- Orthonormal sets and basis
- The Gram-Schmidt process

**Group Theory**

- Binary operations
- Definition, Examples and formation of groups
- Subgroups
- Order of group, Order of an element
- Abelian groups
- Cyclic groups, Cosets, Lagrange's theorem
- Permutation, Even and odd permutations
- Symmetric groups
- Introduction to rings and fields

**Recommended Books**

1. Micheal, O. Searcoid, *Metric Spaces*, Springer, 2007
2. E. Kreyszig, *Introduction to Functional Analysis with Applications*, John Wiley and Sons, 1978
3. W.A. Sutherland, *Introduction to Metric and Topological Spaces*, Clarendon Press Oxford, 1975
4. E.T. Copson, *Metric Spaces*, Cambridge University, Press, 1968
5. G.F. Simmons, *Introduction to Topology and Modern Analysis*, McGraw Hill Company, 1963
6. I.N. Herstein, *Topics in Algebra*, Xerox Publishing Company, 1964.
7. Vivek Sahai and Vikas Bist, *Algebra*, Narosa Publishing House, 1999
8. P.B. Bhattacharya, S.K. Jain and S.R. Nagpaul, *Basic Abstract Algebra*, C.U.P., 1986