

## **MA-402: FUNCTIONAL ANALYSIS**

**Banach Spaces:** Definition and examples of normed spaces, Banach spaces, Characterization of Banach spaces.

**Bounded Linear Transformations:** Bounded linear operators, Functionals and their examples, Various characterizations of bounded (continuous) linear operators, The space of all bounded linear operators, The open mapping and closed graph theorems, The dual (conjugate) spaces, Reflexive spaces.

**Hahn-Banach Theorem:** Hahn-Banach theorem (without proof), Some important consequences of the Hahn-Banach theorem.

**Hilbert Spaces:** Inner product spaces and their examples, The Cauchy-Schwarz inequality, Hilbert spaces, Orthogonal complements, The projection theorem, The Riesz representation theorem.

### **RECOMMENDED BOOKS:**

1. Kreyszig, E., Introductory Functional Analysis with Applications, John Wiley, 1978.
2. Maddox, J., Elements of Functional Analysis, Cambridge, 1970.
3. Simmon, G.F., Introduction to Topology and Modern Analysis, McGraw-Hill, N.Y.1983.
4. Rudin, W., Functional Analysis, McGraw-Hill, N.Y., 1983.