**MA5704 Functional Analysis**

Normed linear space (nls), Banach space with examples, quotient space. Bounded linear transformation, its equivalence with continuity, space of bounded linear transformations, equivalence of two norms in a linear space, equivalence of any two norms in a finite dimensional vector space, other important properties of a finite dimensional nls. Bounded linear functionals on various (nls), Hahn-Banach theorems and consequences, dual and

2nd dual of a nls, separability and reflexivity of nls. Open mapping theorem, closed graph theorem and uniform boundedness principle, some applications of these theorems. Inner product space and examples; Parallelogram law; Polarization identity and related results; Schwartz and triangle inequalities; Orthogonality of vectors, Orthogonal complements and related results; Projection theorem and related results; Orthogonal projection and properties. Weak and weak\*-convergence, Hilbert spaces, Riesz representation theorem.

**References:**

1. B.V. Limaye, Functional Analysis, Second edition, New Age International, New Delhi,1996.
2. G. F. Simmons, “Introduction to Topology and Modern Analysis”, Tata McGraw- Hill, 2013.
3. J. B. Conway, A Course in Functional Analysis, Second edition, Graduate Texts in Mathematics, Vol. 96
4. P. D. Lax, Functional Analysis. Wiley-Interscience, 2002
5. A. Taylor and D. Lay, Introduction to Functional Analysis, Wiley, New York, 1980
6. C. Goffman and G. Pedrick, A First Course in Functional Analysis, Prentice-Hall, 1974
7. Erwin Kreyszig, Introductory Functional Analysis with Applications, John Wiley and sons, 2007
8. M. Thumban Nair: Functional Analysis: A First Course, Prentice Hall of India, New Delhi, 2002.