Veer Narmad South Gujarat University

M. Sc.-II (Tech.)

(Industrial Mathematics with Computer Applications)

w.e.f. July – August 2004

IMCA – 202 Functional Analysis

L	P	T	Total
4	0	0	4

- Normed Spaces and Banach Spaces: Vector spaces, Brief introduction to convergence and completeness in R^n. Introduction to basic results of Linear Algebra, Definition of norm and Banach space with illustrations, Properties of normed spaces, Theorem of completion on normed spaces (without proof), Finite dimensional normed spaces and subspaces, Compactness and finite dimension, Riesz lemma, Linear operators and their illustrations, Bounded continuous linear operators and their illustrations, Linear functionals and illustrations, Algebraic dual space and reflexivity, Functionals on finite dimensional spaces, Normed spaces of operators and dual space.

- Inner Product Spaces – Hilbert Space: Inner product space – definition and illustrations, Hilbert space, Properties of inner product spaces, Orthogonal complements and direct sums, Orthogonal sets, sequences and related series, Total orthonormal sets and sequences, Functionals on Hilbert spaces, Riesz's theorem, Sequilinear form and Riesz representation theorem, Hilbert adjoint operator and its properties, Self adjoint, unitory and normal operators.

- Contraction Mapping Principle: Banach fixed-point theorem, Application of Banach fixed-point theorem to system of linear equations, differential equations and integral equations.

References:

1. Erwin Kreyszig: Introduction to Functional Analysis with Applications, John Wiley & Sons, 1978.

2. B. V. Limaye: Functional Analysis, 2nd ed. New-Age Int. Pvt. Ltd.

3. G. F. Simmons: Introduction to Topology and Modern Analysis, McGraw Hill Book Co.

4. Koffman and Patric: Functional Analysis.

5. A. H. Siddiqui: Functional Analysis, Prentice Hall of India.

6. Sudarshan Nanda: Functional Analysis, Wiley Eastern Pvt. Ltd.

1. M. M. Day: Normed Linear Spaces, 3rd ed., Springer-Verlag, 1973.