Pre Ph.D. Course Work in Mathematics

PAPER- II (Mathematics)

CW 02 :

Unit-I

Typesetting Mathematical Tex with LATEX : Sample document, type Style environments lists, centering tables, verbatim, vertical and horizontal spacing, equalizer environment, fonts, hats and underlining braces, arrays and matrices, customized commands, theorem, like environments, math styles, Document classes and the overall structure, titles for document, sectioning commands, packages inputting files, inputting pictures, making a bibliography, making an index, slides.

Unit-II

Fuzzy set theory : Basic definitions, α-cuts, convex fuzzy sets, basic operation on fuzzy sets, properties & α-cuts, representation of fuzzy sets, first and second decomposition theorem, fuzzy complement, t-norms and t-conorms, algebraic product and sum, bounded difference and sum, combination of operators.

Unit III

Fixed point theory : Definition and example of fixed point and common fixed point, contraction mapping, contractive mapping.

Non expansive mapping, Lipchitz mapping relation between these mapping and continuous mapping.

Banach contraction principle and its generalization.

Fixed point theorem of Brouwer and Schauder.

Fixed Point thorem for multifuction.

Unit IV

Divergent series & some special methods of summation- The sum of a series, some calculation with divergent series, definitions, regularity of a methods, general theorems, linear transformation, regular transformation, special method of summation, Norlund means, regularity of Norlund means, Euler means, Abelian means, simple theorem concerning Cesaro summability.

Unit – V

Fourier series & trigonometric series- Definition, Dirichelet's integral, The Riemann Lebesgue theorem, convergence test, Dini's test, Jordan test, de la vallee-poussin's test, convergence throughout an interval, summation of series by arithmetic means, summability of Fourier series, Fejer's theorem , Weierstrass's approximation theorem, Almost everywhere summability, The Fejer-Lebesgue theorem, A continuous Function with a divergent Fourier series, Modulus of continuity, Integration of Fourier series.

Books recommended-

1- Fuzzy sets and Fuzzy logic, G.H.J.Klir & B Yuan prantice Hall of India, New Delhi.
2- Functional Analysis, Walter Rudin.
3- Functional Analysis, B.V. Limaye.
4- Some topic in Non-Linear functional analysis, M.C. Joshi & R.K. Bose.
5- Real analysis , H.L.Royden.
6- A Course in functional analysis, John B. Conway .
7- A First Course in Functional analysis, D. Somsundaram .
8- A treatise on general Functional H.M. Shrivastav & H.L. Manoch.
9- Trigonometric series, A Zygmund, volume I & II Cambridge university press London/New York.
10- The Theory of function, E.C. Titchmarsh, Oxford.
11- Divergent Series, G.H Hardy , Oxford.
12- Linear operators and Approximation Theory, P.P. korovkin, Hindustan Publishing , Corp. (India)