M.A/M.Sc Mathematics Semester 3rd

Effective from academic session 2011 ⟹ **Repetition for 2012 with minor change**

ABSTRACT MEASURE THEORY

Course No. MM-OP-304

Unit-I

Semiring , algebra and σ - algebra of sets, Borel sets, measures on semirings, outer measure associated with a set function and basic properties, measurable sets associated with an outer measure as a σ - algebra , construction of the Lebesgue measure on R^n .

Unit-II

For f Є L_1 [a, b], $F' = f$ a.e. on [a, b]. If f is absolutely continuous on (a, b) with f(x)=0 a.e, then f = constant. Characterization of an absolutely continuous function as an indefinite Lebesgue integral. Non-Lebesgue integrability of f where f (x) = $x^2\sin(1/x^2)$, f (0) =0 on [0, 1]. Fundamental theorem of calculus for the Lebesgue integral. A brief introduction to L_p spaces. Holder's and Minkowki's inequalities.

Unit-III

Improper Riemann integral as a Lebesgue integral, calculation of some improper Riemann integrable functions, space of Lebesgue integrable functions as completion of Riemann integrable functions on [a,b], change of variables formula and simple consequences, Riemann Lebesgue lemma.

Unit-IV

Product measures and iterated integrals, example of non-integrable functions whose iterated integrals exist (and are equal), Fubini theorem, expressing a double integral as an iterated integral, Tonelli-Hobson theorem as a converse to Fubini theorem, differentiation under the integral sign.

Recommended Books:

1.C.D.Aliprantis and O.Burkinshaw, Principles of Real Analysis

2.Goldberg , R. : Methods of Real Analysis

3.T.M.Apostol : Mathematical Analysis

Suggested Readings:

1.Royden, L: Real Analysis (PHI)

2.Chae, S.B. Lebesgue Integration(Springer Verlag).

3.Rudin, W. Principles of Mathematicals Analysis(McGraw Hill).

4.Barra ,De. G. : Measure theory and Integration (Narosa)

5.Rana ,I.K. : An Introduction to Measure and Integration, Narosa Publications.