Measure and Integration - Video course

COURSE OUTLINE

The course "Measure and Integration" is an advance level course in Real Analysis, followed by a basic course in Real Analysis. The aim of this course is to give an introduction to the theory of measure and integration with respect to a measure.

The material covered lays foundations for courses in "Functional Analysis", "Harmonic Analysis" and "Probability Theory" Starting with the need to define Lebesgue Integral, extension theory for measures will be covered.

Abstract theory of integration with respect to a measure and introduction to L^p spaces,Product measure spaces, Fubini's theorem, Absolute continuity and Radon-Nikodym theorem are other topics that will be covered.

COURSE DETAIL

Module No.	Topic/s	Lectures
1	Need to define Lebesgue Integral	2
2	Semi-algebra, Algebra, Monotone class, Sigma-algebra, Monotone class theorem. Measure spaces.Extension of measures from algebras to the generated sigma-algebras: Measurable sets; Lebesgue Measure and its properties.	10
3	Measurable functions and their properties; Integration a n d Convergence theorems, Lebesgue integral, Fundamental Theorem of Calculus for Lebesgue Integrals (an outline)	15
4	Product measure spaces, Fubini's theorem	5
5	Absolute continuity of measures, Radon-Nikodym theorem Introduction to L^p spaces, Riesz-Fischer theorem; Riesz Representation theorem for L^2 spaces.	8

References:

1. Inder K. Rana, An Introduction to Measure and Integration (2nd ed.), Narosa Publishing House, New Delhi, 2004.