

Subject Code: 1SC2040301

Subject Title: MEASURE THEORY

Course Objective:

- This is an introductory course in Measure Theory which provide a working knowledge of the basic definitions and theorems of the algebra, lebesgue measure, measurable function and Differentiation of monotone functions.

Teaching scheme (hours) per week		credit		Theory Marks		Practical Marks		Total
Theory	Tutorial	Theory	Tutorial	University Assessment	Cont. Assessment	University Assessment	Cont. Assessment	
4	1	4	1	60	40	-	-	100

Subject Contents			
Unit. No	Topic	Total Hours	Weight (%)
1	Algebra and σ -algebra of sets, σ -algebra of Borel sets, Lebesgue outer measure on $\mathbf{R}$, measurable sets, Lebesgue measure.	18	25
2	Measurable function, Littelwood's three principles, Egoroff's theorem, Integral of a simple function, Lebesgue integral of bounded functions, bounded convergence theorem.	18	25
3	Integral of nonnegative functions, general Lebesgue (integral), Fatou's lemma, Monotone convergence theorem, Lebesgue's convergence theorem, convergence in measure.	18	25
4	Differentiation of monotone functions, functions of bounded variation, differentiation of an integral, absolutely continuous functions and indefinite integrals.	18	25

Course Outcome:

On successful completion of the course, students should be able to.....

- Understand the concept of algebra, σ -algebra of Borel sets and Lebesgue measure.
- Understand the concept of Measurable function, Lebesgue integral of bounded functions and bounded convergence theorem.
- Understand the concept of Integral of nonnegative functions, Monotone convergence theorem and convergence in measure.
- Understand the concept of Differentiation of monotone functions, absolutely continuous functions and indefinite integrals.

Note: The course is covered by "Real Analysis" by H. L. Ryoden, Macmillan Pub. Co. 3rd Ed.

List of References:

- “Theory of Functions of a Real Variable” – by I. N. Natansen, Fredrik Pub. Co., 1964.
- “Measure Theory” – by P. R. Halmos, East and West Press.
- “Introduction to Real Variable Theory” – by S. C. saxena and S. N. shah Prentice Hall of India, 1980.
- “Real and Complex Analysis”, Rudin, W., 2nd Edition, Tata McGraw-Hill Publishing Co. Ltd., 1974.