STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI
COURSE PLAN (November 2024 – April 2025)

Department	: **Mathematics**
Name of the Faculty	: **Dr. Teresa Arockiamary S**
Course Title	: **MEASURE THEORY AND INTEGRATION**
Course Code	: **23MT/PC/MI24**
Shift	: **1**

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	remember the basic definitions of measure on the real line	K1
CO2	understand the concepts of measure and measure spaces and related theorems	K2
CO3	apply the properties of theoretical concepts of measure, abstract measure, signed measure and product measure to solve problems	K3
CO4	analyse the properties of measure and integration and use it to develop the theory of signed measures	K4
CO5	evaluate the concepts learnt and its application in applied mathematics and probability	K5

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Nov 18 – 25, 2024 (Day Order 1-6)	1	**Measure on the Real Line** 1.1 Lebesgue outer measure	K1- K5	5	CO1-5	Lecture	Questioning and Interaction

		1.2 Measurable sets					
Nov 26- Dec 3, 2024 (Day Order 1 to 6)	1 2	1.3 Regularity **Measure on the Real Line and Integration of functions of a real variable** **Measure on the Real Line** 2.1 Measurable Functions	K1- K5	5	CO1-5	Lecture Group discussion	Questioning and Interaction
Dec 4-11, 2024 (Day Order 1 to 6)	2	2.2 Borel and Lebesgue Measurability **Integration of Functions of a Real variable** 2.3 Integration of Non-negative Functions	K1- K5	5	CO1-5	Lecture Presentations	Component 1: Seminar (15 marks) Problems only in Unit 1, 2 & 3, Unit 5
Dec 12-19, 2024 (Day Order 1 to 6)	2	2.4 The General Integral 2.5 Riemann and Lebesgue Integrals	K1- K5	5	CO1-5	Lecture Problem solving	Seminar Component 2: Test (20 marks) Unit 2
Dec 20, 2024 (Day Order 1)	2	2.5 Riemann and Lebesgue Integrals (contd…)	K1- K5	1	CO1-5	Presentation	Seminar
Jan 3 – 7, 2025	3	**Abstract measure spaces**	K1- K5	3	CO1-5	Lecture	Seminar Slip test

		3.1 Measures and Outer Measures 3.2 Completion of a Measure				Presentations	
(Day Order 3 to 6)							
Jan 8 – 17, 2025 (Day Order 1 to 6)	3	3.2 Completion of a Measure (contd…) 3.3 Integration with respect to a Measure	K1- K5	5	CO1-5	Lecture Group discussions	Seminar
Jan 18 - 23, 2025		**C.A. Test – I Units 1 & 2**					
Jan 24 -31, 2025 (Day Order 1 to 6)	3 4	3.3 Integration with respect to a Measure **Signed measures and their Derivatives** 4.1 Signed Measures and the Hahn decomposition	K1- K5	5	CO1-5	Lecture Problem solving	Seminar Slip Test
Feb 3-8, 2025 (Day Order 1 to 6)	4	4.1 Signed Measures and the Hahn decomposition (contd…) 4.2 The Jordan Decompositions	K1- K5	5	CO1-5	Lecture Group discussions	Questioning and Interaction
Feb 10– 18, 2025 (Day Order 1 to 6)	4	4.2 The Jordan Decompositions 4.3 The Radon-Nikodym theorem	K1- K5	5	CO1-5	Lecture	Questioning and Interaction

Feb 19- 26, 2025 (Day Order 1 to 6)	4 5	4.4 Some Applications of the Radon-Nikodym Theorem **Measure in Product Space and Probability Spaces** 5.1 Measurability in a Product space	K1- K5	5	CO1-5	Lecture Group discussions	Questioning and Interaction
Feb 27- Mar 6, 2025 (Day Order 1 to 6)	5	5.2 The Product Measure and Fubini's Theorem **Probability Spaces** 5.3Kolmogorov's probability model	K1- K5	5	CO1-5	Presentations Group discussions	Seminar Questioning and Interaction
Mar 7 – 11, 2025 (Day Order 1 to 3)	5	5.3Kolmogorov's probability model(contd…)	K1- K5	3	CO1-5	Presentations	Seminar Questioning and Interaction
Mar 12 –17, 2025	**C.A. Test – II Units 3 & 4**						
Mar 18 – 20, 2025 (Day 4 to 6)	5	5.4 Random variables and random vectors	K1- K5	2	CO1-5	Presentation	Component 3: Quiz (15 marks) Unit 5
Mar 21 - 28, 2025 (Day Order 1 to 6)	5	5.4 Random variables and random vectors(contd…)	K1- K5	5	CO1-5	Presentations	Seminar Questioning

						and Interaction
Mar 29- April 2, 2025 (Day Order 1 to 3)	**REVISION**					

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