1.	Title of the course	Advanced Probability Theory
2.	Course number	MA703L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To MA7107/7
6.	To be offered by	Department of Mathematics and Statistics
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	**Course Objective(s):** To introduce advanced topics in probability theory, like Kolmogorov's Extension Theorem, Radon-Nikodym Theorem, Martingales, Ergodic Theorems. To study topics like Markov Chains, Brownian motions.	
10.	**Course Content:** Measure Theory, Caratheodory's Extension Theorem, Kolmogorov's Extension Theorem, Weak and Strong Laws of Large Numbers, Borel Cantelli Lemma, Kolmogorov 0-1 law, De Moivre-Laplace Theorem, Central Limit Theorems, Conditional Expectation, Radon-Nikodym Theorem, Martingales, Uniform Integrability, Random Walks, Markov Chains, Recurrence and Transience, Stationary Measures, Ergodic Theorems, Brownian Motion, Markov Properties, Path Properties.	
11.	**Textbook(s):** 1. Durrett R, Probability: Theory and Examples, Cambridge University Press (2010). 2. Athreya K B, and Lahiri S N, *Probability Theory*, Hindustan Book Agency (2006).	
12.	**Reference(s):** 1. Dudley R M, *Real Analysis and Probability*, Cambridge University Press (2002). 2. Varadhan S R S, *Probability Theory, Courant Lecture Notes in Mathematics, 7*, American Mathematical Society (2001).	