

INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI
PROFORMA FOR NEW COURSE

1.	Title of the Course	Advanced Probability Theory
2.	Course Number	MA7107
3.	Status of the Course	Core
4.	Structure of Credits	3-0-0-3
5.	Offered To	PG
6.	New Course/Modification to	New
7.	To be Offered by	Department of Mathematics
8.	To take effect from	January 2019
9.	Prerequisite	Nil
10.	Whether approved by the Department	Yes
11.	Course Objective: 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.	
12.	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.	
13.	Text book(s): 1. R. Durrett, <i>Probability: Theory and Examples</i> , Cambridge University Press, (2010). 2. K. B. Athreya, S. N. Lahiri, <i>Probability Theory</i> , Hindustan Book Agency, (2006).	
14.	Reference(s): 1. R. M. Dudley, <i>Real Analysis and Probability</i> , Cambridge University Press, (2002). 2. S. R. S. Varadhan, <i>Probability Theory, Courant Lecture Notes in Mathematics, 7</i> , American Mathematical Society, (2001).	