

COURSE TEMPLATE

1.	Department/Centre proposing the course	MATHEMATICS
2.	Course Title (<i>< 45 characters</i>)	INTRODUCTION TO PROBABILITY AND STOCHASTIC PROCESSES
3.	L-T-P structure	3-1-0
4.	Credits	4
5.	Course number	MAL 250
6.	Status (<i>category for program</i>)	Core for students of B.Tech in Maths and Computing - Program-Linked BS course for other depts.

7.	Pre-requisites (<i>course no./title</i>)	MAL 110 & MAL 120
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8.	Status vis-à-vis other courses (<i>give course number/title</i>)	
8.1	Overlap with any UG/PG course of the Dept./Centre	10% Overlap with MAL XXX (Intro to Statistics)
8.2	Overlap with any UG/PG course of other Dept./Centre	NO
8.3	Supercedes any existing course	NO

9.	Not allowed for (<i>indicate program names</i>)	NO
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10.	Frequency of offering	☐ Every sem ☐ 1 st sem ☒ 2 nd sem ☐ Either sem
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11.	Faculty who will teach the course Niladri Chatterjee, S. Dharmaraja	
12.	Will the course require any visiting faculty?	NO

13.	Course objective (<i>about 50 words</i>): - explanations and expositions of probability and stochastic processes concepts which they need for their experiments and research - theoretical concepts pertaining to handling various stochastic modeling.	
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14.	Course contents (<i>about 100 words</i>) (<i>Include laboratory/design activities</i>): This course provides basic concepts of probability, Random variables, Probability distributions, Two and higher dimensional distributions, Moments, Generating functions, Limit theorems, Classification and properties of stochastic processes, Discrete and continuous time Markov chains, Birth and death processes, Simple Markovian queueing models.	
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15. Lecture Outline (with topics and number of lectures)

Module no.	Topic	No. of hours
1	Basic concepts: Axioms of probability, Probability space, Conditional probability, Independence, Baye's rule	4
2	Random variable: Concept of Random Variable, Some common discrete and continuous distributions	4
3	Distribution of Functions of Random Variables	4
4	Moments, Generating functions, Characteristics function	4
5	Two and higher dimensional distributions, Joint distributions	4
6	multivariate and multinomial distributions	2
7	Conditional distributions, conditional expectation, corelation, covariance	4
8	Limit theorems: Modes of convergences, Law of large numbers, Central limit theorem	4
9	Stochastic processes: Classification, properties, Simple stochastic processes	3
10	Discrete time Markov chains	3
11	Continuous time Markov chains	3
12	Birth and death processes, Simple Markovian Queuing models	3
COURSE TOTAL (14 times 'L')		42

16. Brief description of tutorial activities

Solving of problems on theories taught in lecture classes.

17. Brief description of laboratory activities

Module no.	Experiment description	No. of hours
1	No	
2		
3		
4		
5		
6		
7		
8		
9		
10		
COURSE TOTAL (14 times 'P')		

18. Suggested texts and reference materials

STYLE: Author name and initials, Title, Edition, Publisher, Year.

1. Kishor S. Trivedi, Probability and Statistics with Reliability, Queueing and Computer Science Applications, second edition, Wiley, 2001.
2. Sheldon M. Ross, Introduction to Probability Models, 9th edition, Academic Press, 2000.
3. Liliana Blanco Castaneda, Viswanathan Arunachalam, S. Dhrmaraja, Introduction to Probability and Stochastic Processes with Applications, Wiley, 2012.

19. Resources required for the course (*itemized & student access requirements, if any*)

19.1	Software	NO
19.2	Hardware	NO
19.3	Teaching aides (videos, etc.)	NO
19.4	Laboratory	NO
19.5	Equipment	NO
19.6	Classroom infrastructure	LCD PROJECTOR
19.7	Site visits	NO

20. Design content of the course (*Percent of student time with examples, if possible*)

20.1	Design-type problems	no
20.2	Open-ended problems	no
20.3	Project-type activity	no
20.4	Open-ended laboratory work	no
20.5	Others (please specify)	no

Date: 28th February, 2013

 (Signature of the Head of the Department)