

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN - B.Tech. (CSE) III Semester (A) July to December 2017			
Course Title	Introduction to Probability Theory		
Course Code	MAIR 37	No. of Credits	3
Department	Mathematics	Faculty	Dr.D.Deivamoney selvam
Pre-requisites Course Code	MAIR 21 & MAIR 22		
Course Coordinator(s) (if, applicable)			
Other Course Teacher(s)/Tutor(s) E-mail	-	Telephone No.	2503667
Course Type	Core course		
COURSE OVERVIEW			
<p>Definition of probability-Notion of sample space- event- basic combinatorial analysis-posing probability problems mathematically- examples</p> <p>Conditional probability –Baye’s theorem-random variable- probability mass function- density function- distribution function-Bernoulli trial- Binomial distribution- Poisson approximation- Poisson distribution-normal distribution- moment generating function</p> <p>Joint probability density function-marginal and conditional densities- function of random variable-covariance- conditional expectation-correlation coefficient</p> <p>Chebyshev’s inequality-law of large numbers-central limit theorem- random processes- Markov dependence- Markov chain- definition- examples- ergodicity</p> <p>Finite Markov chain- various states-limiting probability-Introduction of Markov process-M/M/1 queue with finite and infinite waiting space.</p>			
COURSE OBJECTIVES			
<ol style="list-style-type: none"> 1. To understand the basic concept of randomness, random variable, its categories and behaviour 2. To study various probabilistic tools systematically 3. To formulate problems arising in engineering and technology, using the tool of probability and random process, solving them and giving interpretation for the results and modifying, if necessary. 			
			Aligned Programme Outcomes

COURSE OUTCOMES (CO)	(PO)
<p>1. Understand the axiomatic formulation of modern Probability Theory and think of random variables as an intrinsic need for the analysis of random phenomena</p> <p>2. Characterize probability models and function of random variables based on single & multiples random variables.</p> <p>3. To evaluate and apply moments & characteristic functions and understand the concept of inequalities and probabilistic limits.</p> <p>4. To understand the concept of random processes and determine types like Markov, renewal and stationary processes.</p> <p>5. To demonstrate the specific applications to Poisson and Makov processes and application of queues in computer technology</p>	<p>1. To identify and use probabilistic tool like random variable, its type for the framing the problems in electronic topics</p> <p>2. To study the randomness in problem arising computer technology.</p> <p>3. To study the random behavior of the problems in the computer engineering with reference software and hardware components.</p>

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week	Topic	Mode of Delivery
1	1	Introduction & definitions Addition theorems- conditional probability Probability problems algebraic – geometric- combinatory	Chalk & Talk
2	2	Total & Baye’s Theorems Mutually exclusive & independent events, Probability space & sigma space	Chalk & Talk
3	3	Random variables definition & types pmf, pdf, PDF. Mixed definitions & properties Standard distributions	Chalk & Talk
4	4	Non-standard distributions Two random variables and joint distribution function	Chalk & Talk
5	5	Joint probability mass function (pmf), probability density function (pdf), probability distribution function(PDF) properties & problems independent random variables Marginal distributions	Chalk & Talk
6	6	Conditional densities & conditional expectations Covariance function and correlation coefficient Function of one random variable $Y=f(X)$	Chalk & Talk
7	7	$Y=f(X)$ for $f(X) = aX+b, X^2, e^{ax}, \log(X), (X)^{1/2}$ problems	Chalk & Talk
8	8	Function of two random variables $Z=f(X,Y)$ for $f(X,Y)=X+Y, X-Y, X/Y, XY, \max(X,Y)$ and $\min(X,Y)$ problems	Chalk & Talk
9	9	Generating Function types- MGF,CF,PGF, MGF properties & MGF for standard df, problems MGF for nonstandard df,	Chalk & Talk

		CF properties and problems	
10	10	Chebyshev's inequality, law of large numbers-central limit theorem	Chalk & Talk
11	11	random processes- Markov dependence- Markov chain-definition- examples- ergodicity	Chalk & Talk
12	12	Finite Markov chain- various states-limiting probability	Chalk & Talk
13	13	Introduction of Markov process Poisson Process, Properties of Poisson Process.	Chalk & Talk
14	14	Queues, Characteristics, M/M/1 queue with finite and infinite waiting space.	Chalk & Talk

COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assignment-1	5 th week	3 weeks	5%
2	Test-1	6 th week	1 hour	20%
3	Assignment-2	11 th week	3 weeks	5%
4	Test-2	12 th week	1 hour	20%
5	Semester Examination	17 th /18 th week	3 hours	50%

ESSENTIAL READINGS : Textbooks, reference books Website addresses, journals, etc

- 1.Feller.W. An Introduction to Probability Theory and Applications Vol.I, Wiley Eastern, New Delhi
- 2.Papoulis. A.,Probability, Random variables and Stochastic Processes, McGraw Hill, 2002.
- 3.E.Wong, Introduction to Random Processes, Springer Verlag,1983.
- 4.Allen.A.O. Introduction to Probability, and Statistics and Queuing Theory with Computer Science Applications, Academic Press, 2006 Reprint.
5. Ross. S.M. Introduction to Probability Model (9/e) academic press 2007

COURSE EXIT SURVEY

Feedback Questionnaire (end semester)

COURSE POLICY (attendance, evaluation, grading, plagiarism, academic honesty, attendance etc.)

1. All students are expected to attend all classes. To appear for the final semester examination 75% of attendance is essential and students may be permitted to take leave only with prior written permission from the faculty in charge of the subject for a maximum of 25% of the total contact hours.
2. Absence for reasons whatsoever is not permitted above 25%
3. In exceptional cases special contact hours are permitted to compensate the attendance shortage to meet the minimum requirement of 75%
4. For students below 50% of attendance, there will redo the course.

ADDITIONAL COURSE INFORMATION

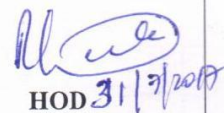
Course Co coordinator will be available for any clarification in the above subject matters and for clarifications.



Faculty in charge



CC-Chairperson


HOD 31/7/2018