

LOK JAGRUTI UNIVERSITY (LJU)
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Robotics and Artificial Intelligence(706)

Bachelor of Engineering (B.E.) – Semester – III

Course Code:	017061391
Course Name:	Introduction to Probability Theory and Stochastic Processes
Category of Course:	Basic Science Course (BSC)
Prerequisite Course:	Mathematics- I (017061191), Mathematics- II (017061291)

Teaching Scheme				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Total Hours
3	2	0	5	50

Syllabus				
Unit No.	Topic	Prerequisite Topic	Successive Topic	Teaching Hours
01	Basic Probability			6 (11%)
	1.1 Basic Definitions: Random Experiment, Outcome, Trial, Event, Exhaustive Event, Mutually Exclusive Event, Equally Likely Event, Independent Events, Favorable Events.	---	---	
	1.2 Definitions of Probability: Classical & Axiomatic, Sample Space, Theorems on Probability: De Morgan's Laws, Addition Theorem, Examples.	---	---	
	1.3 Conditional probability, Multiplicative Theorem for Independent Events, Bayes' Theorem, Examples.	---	---	
02	Random Variables			6 (9%)
	2.1 Random variables, Discrete Random Variable, Probability Mass Function, Discrete Distribution Function, Mathematical Expectation, Variance.	Basic Differentiation and Integration (017061191-Unit-3.4)	---	
	2.2 Continuous Random Variable, Probability Density Function, Continuous Distribution Function, Mathematical Expectation, Variance.	Probability Density Function (017061391-Unit-2)	---	
	2.3 Two Dimensional Discrete Random Variables, Joint Probability Mass Function, Cumulative Distribution Function, Marginal Probability Function, Conditional Probability Function.	Multiple Integral (017061191-Unit-7.1)	---	
03	Basic Statistics			5 (10%)
	3.1 Measure of Central Tendency: Mean, Median and Mode.	---	---	
	3.2 Mean: Mean for Individual Observations, Mean for Discrete Frequency Distribution, Mean for Continuous Frequency Distribution, Mean from Assumed Mean, Mean from Step Deviation.	---	---	
	3.3 Median: Median for Individual Observations, Median for Discrete Frequency Distribution, Median for Continuous Frequency Distribution (Less than and Greater than types)	---	---	
	3.4 Mode: Mode for Individual Observations, Mode for Discrete Frequency Distribution, Mode for Continuous Frequency Distribution.	---	---	
	3.5 Measures of Dispersion: Standard Deviation & Variance.	---	---	
	3.6 Moments: Row Moments, Central Moments, Relation Between Row and Central Moments.	---	---	
	3.7 Skewness, Karl- Pearson's Co-efficient of Skewness, Kurtosis.	---	---	
04	Correlation and Regression			6 (10%)
	4.1 Correlation, Types of Correlation, Karl Pearson's Correlation Co-efficient, Properties of Correlation Co-efficient.	---	---	
	4.2 Rank correlation, Spearman's Rank Correlation Co-efficient, Tied Rank.	---	---	
	4.3 Regression, Types of Regression, Lines of Regression, Regression Co-efficient, Properties of Regression Co-efficient & Regression Lines.	---	---	
05	Binomial and Poisson Distributions			4 (10%)
	5.1 Binomial Distribution, Conditions for Binomial Distribution, Bernoulli's Trail, Recurrence Relation for Binomial Distribution, Binomial Frequency Distribution.	---	---	
	5.2 Poisson Distribution, Conditions for Poisson Distribution, Recurrence Relation for Poisson Distribution, Poisson Frequency Distribution.	---	---	
06	Normal and Exponential Distributions			4 (9%)
	6.1 Introduction to Normal Distribution.		---	
	6.2 Normal Distribution, Examples.		---	

2	S. Ross, A First Course in Probability, 6th Ed., Pearson Education India.
3	W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, Wiley.
4	L. Castaneda, V. Arunachalam, D. Dharmaraja, Introduction to Probability and Stochastic Processes with Applications, Wiley.

List of Open Source Software/Learning website	
1	https://nptel.ac.in