

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Integrated B.Tech.(CSE)-MBA
Course Code:	CSI0402
Course Title:	Probability and Statistics
Course Type:	Core
Year of Introduction:	2021-22

Credit Scheme

L	T	Practical Component				C
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Course Learning Outcomes (CLO):

At the end of the course, students will be able to –

1. relate the concepts of probability and statistics and their need in engineering and management
2. explain different probability distributions
3. apply concepts and methods in probability and statistics for modeling problems in engineering and management domain
4. analyze the correctness of proposed hypothesis

Syllabus:

Unit	Syllabus	Total Teaching hours: 30 Teaching hours
Unit-I	The Role of Statistics in Engineering: The Engineering Method and Statistical Thinking, Collecting Engineering Data, Probability and Probability Models	02
Unit-II	Probability and Probability Distributions: Independence, Bayes Theorem, Discrete & Continuous Random Variables, Probability Mass and Density Functions, Cumulative Distribution Functions, Mean and Variance of a Random Variable, Discrete & Continuous Distributions, Joint Probability Distributions	07
Unit-III	Descriptive Statistics and Point Estimation of Parameters: Numerical Summaries of Data, Frequency Distributions and Histograms, Point Estimation	04
Unit-IV	Statistical Intervals for a Single Sample: Confidence Interval on the mean of a Normal Distribution, Confidence Interval on the Variance and Standard Deviation of a Normal Distribution, Large-Sample Confidence Interval for a Population Proportion, Guidelines for Constructing Confidence Intervals, Tolerance and Prediction Intervals	07
Unit-V	Hypothesis Testing: Statistical Hypothesis, P-Values in Hypothesis Test, Tests on the Mean of a Normal Distribution, Tests on the Variance and Standard Deviation of a Normal Distribution, Tests on a Population Proportion, Testing for Goodness of Fit	06
Unit-VI	Simple & Multiple Linear Regression: Properties of the Least Squares Estimators, Hypothesis Tests in Simple & Multiple Linear Regression, Confidence Intervals, Prediction of New Observations, Correlation	04

Self-Study: The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents

- Suggested Readings/
References:
1. C.M. Douglas and G.C. Runger, Applied Statistics and Probability for Engineers, Wiley
 2. J. Susan Milton and Jesse Arnold, Introduction to Probability and Statistics: Principles and Applications for Engineering and the Computing Sciences, , McGraw Hill Education
 3. Timothy C. Urdan, Statistics in Plain English, Routledge
 4. Bertsekas, Dimitri and J. Tsitsiklis, Introduction to Probability, Athena Scientific
 5. Alvin Drake, Fundamentals of Applied Probability Theory, McGraw-Hill
 6. Sheldon Ross, A First Course in Probability, Prentice Hall

Suggested List of Experiments:	Sr. No.	Title	Hours
	1	Basics of Python, Numpy and Matplotlib	04
	2	Bayes' Theorem	02
	3	Descriptive Statistics and Visualization	02
	4	Application of Gaussian Distribution	02
	5	Application of Binomial Distribution	02
	6	Application of Multivariate Bernoulli and Multinomial Distributions	04
	7	Simple and Multiple Linear Regression with model statistics	04

Suggested Case List: -NA-