

Engineering Mathematics – 2 (Probability and Statistics)

Course Code	19BS1202	Year	I	Semester	II
Course Category	Basic Sciences	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Nil
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	classify the concepts of data science and its importance
CO2	apply discrete and continuous probability distributions
CO3	explain the association of characteristics through correlation and regression tools
CO4	identify the components of a classical hypothesis test
CO5	infer the statistical inferential methods based on small and large sampling tests

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	H	M											L	
CO2	H	M											L	
CO3	H	M											L	
CO4	H	M											L	
CO5	H	M											L	

Syllabus		
Unit No.	Contents	Mapped CO
I	Data Science and Probability: Data Science: Statistics introduction, Population vs Sample, collection of data, primary and secondary data, types of variable: dependent and independent Categorical and Continuous variables, data visualization, Measures of central tendency, Measures of dispersion (variance). Probability: Probability axioms, addition law and multiplicative law of probability, conditional probability, Baye's theorem (without proof).	CO1
II	Random Variable and Probability Distributions: Random variables (discrete and continuous), probability density functions, probability distribution - Binomial, Poisson and normal distribution-their properties (mathematical expectation and variance).	CO2
III	Correlation, Regression and Estimation: Correlation, correlation coefficient, rank correlation, regression, lines of regression, regression coefficients, principle of least squares and curve fitting (straight Line, parabola and exponential curves). Estimation: Parameter, statistic, sampling distribution, point estimation, properties of estimators, interval estimation.	CO3
IV	Testing of Hypothesis and Large Sample Tests: Formulation of null hypothesis, alternative hypothesis, the critical region,	CO4

	two types of errors, level of significance, and power of the test. Large Sample Tests: Test for single proportion, difference of proportions, test for single mean and difference of means. Confidence interval for parameters in one sample and two sample problems	
V	Small Sample Tests: Student t-distribution (test for single mean, two means and paired t-test), testing of equality of variances (F-test), χ^2 - test for goodness of fit, χ^2 - test for independence of attributes.	CO5

Learning Resources	
Text Books	
1. Miller and Friends, Probability and Statistics for Engineers, 7/e, Pearson, 2008. 2. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11/e, Sultan Chand & Sons Publications, 2012.	
Reference Books	
1 S. Ross, A First Course in Probability, Pearson Education India, 2002. 2.W. Feller, An Introduction to Probability Theory and its Applications, 1/e, Wiley, 1968	
e- Resources & other digital material	
1. https://nptel.ac.in/courses/111105041/ 2. https://nptel.ac.in/courses/111102111/ 3. https://nptel.ac.in/courses/111105090/	