23BS22T2 - PROBABILITY & STATISTICS

(Common to CSE, CSE-AI&ML and IT)

<table>
<tr><td>Course Category:</td><td>Engineering Science</td><td>Credits:</td><td>3</td></tr>
<tr><td>Course Type:</td><td>Theory</td><td>Lecture-Tutorial-Practical:</td><td>3-0-0</td></tr>
<tr><td>Prerequisite:</td><td>Intermediate Mathematics</td><td>Sessional Evaluation:
Univ. Exam Evaluation:
Total Marks:</td><td>30
70
100</td></tr>
<tr><td>Objectives:</td><td colspan="3">Students undergoing this course are expected:
• The main objective of this course is to provide students with the foundations of probabilistic and statistical analysis
• Varied applications in engineering and science</td></tr>
<tr><td>Course Outcomes</td><td colspan="3">Upon successful completion of the course, the students will be able to:
CO1 Acquire knowledge in finding the analysis of the data quantitatively or categorically and various statistical elementary tools
CO2 Develop skills in designing mathematical models involving probability, random variables and the critical thinking in the theory of probability and its applications in real life problems
CO3 Apply the theoretical probability distributions like binomial, Poisson, and Normal in the relevant application areas.
CO4 Analyze to test various hypotheses included in theory and types of errors for large samples.
CO5 Apply the different testing tools like t-test, F-test, chi-square test to analyze the relevant real life problems</td></tr>
<tr><td>Course Content</td><td colspan="3">UNIT-I
Descriptive statistics: Statistics Introduction, Population vs Sample, Collection of data, primary and secondary data, Measures of Central tendency, Measures of Variability (spread or variance) Skewness, Kurtosis, correlation, correlation coefficient, rank correlation, regression coefficients, method of least squares, regression lines.

UNIT-II
Probability:Probability, probability axioms, additional multiplicative law of probability, conditional probability, Baye’s theorem, random variables (discrete and continuous), probability density functions, properties, mathematical expectation.

UNIT-III
Probability distributions:Binomial, Poisson and Normal-their properties (Chebyshev sin equality).Approximation of the binomial distribution to normal distribution.</td></tr>
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	UNIT-IV **Estimation and Testing of hypothesis, large sample tests:** Estimation-parameters, statistics, sampling distribution, point estimation, Formulation of null hypothesis, alternative hypothesis, the critical and acceptance regions, level of significance, two types of errors 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 parameter sin one sample and two sample problems **UNIT-V** **Small sample tests:** Student t-distribution (test for single mean, two means and paired t-test), testing of equality of variances (F-test), $\chi 2$ -test for goodness off it, $\chi 2$-test for independence of attributes.
Text Books & References Books	**TEXT BOOKS:** 1. Miller and Freunds, 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. **3.** B.V. Ramana, Higher Engineering Mathematics, Mc Graw Hill Education.
E-Resources	1. https://onlinecourses.nptel.ac.in/noc21_ma74/preview 2. https://onlinecourses.nptel.ac.in/noc22_mg31/preview