MTH302:PROBABILITY AND STATISTICS

L:3 T:0 P:0 Credits:3

Course Outcomes: Through this course students should be able to

CO1 :: recall the basic principles of probability and Bayes theorem.

CO2 :: discuss the concept of random variables and its characterizations.

CO3 :: apply probability distributions to find the solution of different engineering problems.

CO4 :: demonstrate sample, a population and statistical inference.

CO5 :: understand hypothesis testing and its applications.

CO6 :: analyze relationships among the variables through correlation and regression.

Unit I

Basics of Probability : sample space, events, counting sample points, Probability of an Event, additive rules, conditional probability, multiplicative rules, Bayes' Rule

Unit II

Random variables and its Characterization : discrete and continuous random variables and their distribution functions, joint probability distributions, mean of a random variable, variance and covariance of random variables, Chebyshov's theorem

Unit III

Special distributions : the Bernoulli process, binomial distribution, negative binomial and geometric distributions, Poisson distribution and the Poisson process, gamma and exponential distributions, normal distribution

Unit IV

The Central Limit Theorem and Point Estimation : the central limit theorem, unbiased estimators, consistent estimator, maximum likelihood estimation

Unit V

Hypothesis Testing : Types of Error, Student t-test for single mean and difference of means, Z-test for single mean and difference of means, F-test, goodness of fit, Chi- Square Test

Unit VI

Correlation and Regressions : Scatter plots, Coefficient of Correlation, Coefficient of Correlation for bi-variate data and probability distribution, Spearman's Rank Correlation Coefficient, Linear Regression, Properties of Regression Coefficients, Fitting of a curve

Text Books:

1. PROBABILITY AND STATISTICS FOR ENGINEERS AND SCIENTISTS by RONALD E. WALPOLE, RAYMOND H. MYERS,SHARON L. MYERS, AND KEYING YE, PEARSON

References:

1. PROBABILITY STATISTICS AND RANDAM PROCESSES by T VEERARAJAN, MCGRAW HILL EDUCATION

2. FUNDAMENTALS OF MATHEMATICAL STATISTICS by S.C.GUPTA AND V.K.KAPOOR, SULTAN CHAND & SONS (P) LTD.