

## 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, Chebyshev'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 RANDOM 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.