

## 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 concept of random variables and its distribution functions.
- CO2 :: recognize relationships among the variables through correlation and regression.
- CO3 :: apply probability distributions to find the solution of different engineering problems.
- CO4 :: describe sample, population and statistical inference.
- CO5 :: understand hypothesis testing and its applications.

### Unit I

#### **Random Variables and Probability**

**Distributions** : discrete and continuous random variables and their distribution functions, joint probability distributions, mean, variance and covariance of random variables, Chebyshev's theorem( without proof)

### Unit II

**Correlation and Linear regression** : scatter plots, correlation coefficient and its properties, Karl Pearson's correlation coefficient, Spearman's rank correlation coefficient, Linear regression and its properties

### Unit III

**Special Discrete Distributions** : bernoulli process, binomial distribution, negative binomial distribution, geometric distribution, poisson distribution, moment generating function ( without proof) of the above mentioned distributions.

### Unit IV

**Special Continuous Distributions** : normal distribution, gamma distribution, exponential distribution, moment generating function ( without proof) of the above mentioned distributions.

### Unit V

**Point Estimation and the Central Limit Theorem** : the central limit theorem(without proof), unbiased estimator, consistent estimator, efficient and sufficient estimator, maximum likelihood estimation

### Unit VI

**Testing of Hypothesis** : types of error, Z-test for single mean and difference of means, Student's t-test for single mean and difference of means, F-test, Chi-square test for goodness of fit

### 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.

