PROBABILITY AND STATISTICS

B.Tech. II Year I Sem

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
23MA302	Basic Sciences	L	T	P	4	CIA	SEE	TOTAL
		3	1	0		40	60	100
Contact Classes: 48	Tutorial Classes: 0	Practical Classes: Nil				Total Classes:48		

Pre-requisites: Mathematics courses of first year of study.

Course Objectives: To learn The theory of Probability, and probability distributions of single and multiple random variables• The sampling theory and testing of hypothesis and making statistical inferences•

Course outcomes: After learning the contents of this paper the student must be able to

1. Apply the concepts of probability and distributions to some case studies.
2. Distinguish between discrete and continuous probability distributions.
3. Formulate and solve problems involving random variables and apply statistical methods for analyzing experimental data.
4. Apply the concept of estimation and testing of hypothesis to case studies.
5. Estimate the correlation and regression values for the given data.

UNIT – I:

Probability: Sample Space, Events, Counting Sample Points, Probability of an Event, Additive Rules, Conditional Probability, Independence, and the Product Rule, Baye's Rule.

Random Variables and Probability Distributions: Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions

UNIT – II: Expectation and discrete distributions: Mean of a Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables.

Discrete Probability Distributions: Binomial Distribution, Poisson distribution, Geometric Distribution.

UNIT – III:

Continuous Distributions and sampling: Uniform Distribution, Normal Distribution, Areas under the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial Distributions.

Fundamental Sampling Distributions: Random Sampling, Some Important Statistics, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem, t –Distribution, F–Distribution.

UNIT – IV:

Estimation & Tests of Hypotheses: Introduction, Statistical Inference, Classical Methods of Estimation, Single Sample: Estimating the mean, standard error of a point estimate, prediction interval. Two sample: Estimating the difference between two means, Single sample: Estimating a proportion, Two samples: Estimating the difference between two proportions, Two samples: Estimating the ratio of two variances.

Statistical Hypotheses: General Concepts, Testing a Statistical Hypothesis, Single sample: Tests concerning a single mean, Two samples: tests on two means, One sample: test on a single proportion. Two samples: tests on two proportions, Two– sample tests concerning variances.

UNIT – V: Applied Statistics: Curve fitting by the method of least squares, fitting of straight lines, second degree parabolas and more general curves, Correlation and regression, Rank correlation.

TEXT BOOKS:

1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics for Engineers & Scientists, 9th Ed. Pearson Publishers.

2. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications.

REFERENCE BOOKS:

1. T. T. Soong, Fundamentals of Probability and Statistics for Engineers, John Wiley & Sons, Ltd, 2004.

2. Sheldon M Ross, Probability and statistics for Engineers and scientists, academic press.