1/3 MCA First Semester

CA1T4 **PROBABILITY AND STATISTICS** **Credits : 4**

Lecture Hours : 4 periods / week Internal assessment : 30 Marks

Semester and Examination: 70 Marks

Course Description:

It covers basic concepts of descriptive statistics, probability, random variables, probability distributions, parameter estimation, hypothesis testing, linear correlation, linear regression, contingency tables, and analysis of variance. Applications are made to business, social sciences, and natural/ physical sciences.

Course Objectives:

- To create, simulate, and analyze elementary probability models
- To explain the limitations of the statistical inferences made there from.
- To better assess your understanding of mathematical concepts and their importance.
- To write math in a clear, concise way that emphasizes what's important.
- Develop skills in understanding and applying basic statistical methods.
- Develop an appreciation for the use of statistics in decision making, and an appreciation of its limitations.
- Develop an ability to use computers and/or calculators for statistical analysis of data.

UNIT I:

Probability - Sample space and events – Probability – The axioms of probability - Some elementary theorems - Conditional probability – Baye's theorem.

UNIT II:

Random variables – Discrete and continuous – Distribution – Distribution function.

UNIT III:

Distribution - Binomial, Poisson and normal distribution – related properties.

UNIT IV:

Sampling distribution - Pulations and samples - Sampling distributions of mean (known and unknown) proportions, sums and differences.

UNIT V:

Estimation - Point estimation – interval estimation - Bayesian estimation.

UNIT VI:

Test of Hypothesis – Means and proportions – Hypothesis concerning one and two means – Type I and Type II errors. One tail, two-tail tests.

UNIT VII:

Tests of significance – Student's t-test, F-test, ÷2 test. Estimation of proportions.

UNIT VIII:

Curve fitting: The method of least squares – Inferences based on the least squares estimations - Curvilinear regression – multiple regressions – correlation for univariate and bivariate distributions.

Learning Resources :

Text Books:

1. Probability and statistics for engineers: Erwin Miller And John E.Freund. Prentice-Hall of India / Pearson , 8/e, 2011.
2. Probability, Statistics and Queuing Theory, Trivedi, John Wiley and Sons, 2/e, 2008.

Reference Books:

1. Fundamentals of Mathematical Statistics, S.C.Gupta, V.K.Kapoor . Sultan Chand, 11/e, 2002.
2. V.K Rohtagi and A.K. Saleh, **An Introduction to Probability and Statistics**, John Wiley & Sons, 2/e, 2005
3. A.M. Goon, M.K. Gupta and T.S. Dasgupta, **An Outline of Statistical Theory**), Vol. II, The World Press Pvt. Ltd., 2/e, 2000