

MC122-Probability and Statistics

Course description and Objectives:

Aim of this course is to introduce statistical techniques which are useful in every walk of life. It also introduces some probability which has many applications. By the end of the course, student would have learned regression, correlation techniques, probability, distributions, test of hypothesis and their applications.

Course outcomes:

The students will understand

- the use of statistical techniques in every walk of life.
- The statistical techniques like regressions, correlation can be used for finding qualitative and quantitative relation between two or more variables
- Probability, probability distributions can be used in many places like academics, real life problems for decision making.
- Test of hypothesis will be useful for them in taking decisions.
- All these topics are useful in academics as well as in research work.
- They find applications at work places as well as in their real life.

UNIT I - Descriptive Statistics

Basic Definitions, Frequencies, Graphical Representation, Histogram, Ogive curves, Measures of Central tendency, Arithmetic mean, Median, Mode, mean deviation, standard deviation, Symmetry and Skewness, Karl Pearson's Coefficient of skewness.

UNIT II - Curve Fitting and Correlation, Regression

Least squares method, curve fitting (straight line and parabola only) Covariance, Correlation, Types, Pearson's Coefficient of correlation, Rank correlation, Spearman's rank correlation. Regression, Regression lines, multiple regression.

UNIT III - Probability

Introduction, Definition (Classical and Axiomatic approach), Addition theorem, Conditional probability, Multiplication theorem, Total probability, Bayes theorem.

UNIT IV - Distributions

Random variables, Discrete and Continuous variables, Introduction to Distributions.

Binomial distribution : Definition, Mean and Standard deviation, Recurrence relation, Applications, Fitting of binomial distribution.

Poisson Distribution : Definition, Mean and Standard deviation, Recurrence relation, Poisson Distribution is an approximation of Binomial distribution, Applications, Fitting of Poisson distribution.

Geometric Distribution : Definition, Properties. *Normal Distribution* : Definition, Normal curve, Mean and Standard deviation,

Median, Mode, Normal Distribution applications, Normal Distribution is an approximation to Binomial distribution.

Exponential Distribution : Definition, Properties.

UNIT V - Sampling Methods

Population and Sampling, Parameters and Statistics, Types of sampling, Sampling Distributions, Central limit theorem, Standard Error of mean from infinite population, Standard deviation of variance. Test of hypothesis and test

of significance, confidence limits, confidence interval, Test of significance of Large samples, T-distribution, Chi square test.

TEXTBOOKS :

1. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand & Co., New Delhi, 2011.

2. Miller and Fruinds, Fundamentals of Probability and Statistics, PHI publication, 2003.

REFERENCEBOOKS :

1. S.C. Gupta and V.K. Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand & Co., New Delhi, 2005.

2. B.V. Ramana, "Higher Engineering Mathematics", 3rd Edition, Tata McGraw-Hill Publishing Co, 2008.