17HS016   Mathematical Expectation and Probability Distributions

COURSE DESCRIPTION AND OBJECTIVES

Learn and be able to apply the properties of mathematical expectation and how it will be used to find the characteristics of the given data. To learn different alternative ways of obtaining the characteristics of data and to find the characteristics of the standard distributions in discrete and continuous random variables

COURSE OUTCOMES

After the completion of the course, the student will be able to achieve the following outcomes:

COs	Outcomes
1	Able to apply mathematical expectation in real time situations
2	Obtain Population constants for different distributions
3	Apply different methods to find the population constants for a given data
4	Can find the characteristics of the standard populations
5	Compare the different alternative methods in finding the characteristics

SKILLS

- ✓ Choose appropriate method to find the characteristics of the data
- ✓ Apply an appropriate method for industrial applications
- ✓ Fit appropriate probability distribution to the given data

Unit-I

Mathematical expectation : Mathematical expectation(ME) of a random variable and function of a random variable. Moments and covariance using mathematical expectation with examples. Addition and Multiplication theorems on expectation. Definitions of M.G.F, C.G.F, P.G.F, C.F its properties. Chebyshev and Cauchy - Schwartz inequalities.

Un i t-I I

Discrete Distributions : Binomial and Poisson distributions, their definitions, 1st to 4 central moments, M.G.F, C.F, C.G.F, P.G.F, mean, variance, additive property if exists. Possion approximation to Binomial distribution.

Un i t - I I I

Negative Binomial, geometric, hyper geometric distributions - Definitions, means, variances, M.G.F, C.F, C.G.F, P.G.F, reproductive property if exists. Binomial approximation to Hyper Geometric Distribution, Poisson approximation to Negative binomial distribution.

Un i t – IV

Continuous Distributions : Rectangular, Exponential, Gamma, Beta Distributions of two kinds. Other properties such as mean , variance,M.G.F, C.G.F, C.F, reproductive property.

Unit – V

Normal Distribution: Definition, Importance, Properties, M.G.F, additive properties, Interrelation
between Normal and Binomial, Normal &Poisson distribution. Cauchy Distribution .

Text Books:

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand &

   Sons, New Delhi.

2. BA/BSc I year statistics - descriptive statistics, probability distribution - Telugu Academy - Dr.M.Jaganmohan Rao,Dr N.Srinivasa Rao, Dr P.Tirupathi Rao, Smt.D.Vijayalakshmi

3. K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC. PHI.

Reference books:

1. Willam Feller : Introduction to Probability theory and its applications. Volume –I, Wiley

2. Goon AM, Gupta MK, Das Gupta B : Fundamentals of Statistics , Vol-I, the World Press

   Pvt.Ltd., Kolakota.

3. Hoel P.G: Introduction to mathematical statistics, Asia Publishing house.

4. M. JaganMohan Rao and Papa Rao: A Text book of Statistics Paper-I.

5. Sanjay Arora and Bansi Lal: New Mathematical Statistics: Satya Prakashan , New Delhi

6. Hogg Tanis Rao: Probability and Statistical Inference. 7th edition Pearson.