

# **SYLLABUS FOR LECTURER 10 +2 STATISTICS**

## **UNIT – I PROBABILITY**

Sample space, classical and Aromatic definition of probability. Conditional probability, Baye's theorem and Independent events.

Random variable, probability distribution of a random variable, discrete and continuous r.v. Expectation of theorems on expectation. Conditional expectation, moments, moment generating function and characteristic function with their elementary properties.

## **UNIT – II STANDARD PROBABILITY DISTRIBUTIONS**

Binomial, Poisson, Negative Binomial, geometric and Hyper Geometric distributions – their derivation, moments, m.g.f and problems based on them.

## **UNIT – III CONTINUOUS DISTRIBUTIONS**

Uniform or rectangle distribution, Normal distribution, Beta and Gamma distributions. Bivariate Normal distribution and its conditional and marginal distribution. Derivation of  $X(\text{chi-square})$ ,  $t$  and  $F$  their moments and m/.g.f.

## **UNIT – VI ESTIMATION**

Point estimation and interval estimation. Criteria for good estimator., Methods of estimation – maximum likelihood, method of moments, method of minimum chi-square etc. sufficient statistics, factorization theorem, Fisher Neyman criterion. Completeness and bounded completeness. Revo-Blackwell theorem. Lehmann Scheffe theorem.

Determination of confidence interval based on small and large samples. Relation between confidence estimation and hypothesis testing.

## **UNIT – V TESTING OF HYPOTHESIS**

Simple and composite Hypothesis, Errors of first and second kind, critical region, power of a test. Most powerful test. Neyman pearson Lemma and its generalization with applications of NPL. Derivation of common tests of a simple Hypothesis against a simple alternative. Uniformly most powerful tests of U.M.P. unbiased tests. Likelihood ratio tests.

## **UNIT – VI SAMPLING THEORY**

SRSWR/SRSWOR expected values and sampling variances of the sample mean, expected value of sample mean square.

Stratified random sampling, proportional and optimum allocation, choice of sample sizes in different strata. Variances under different allocations. Comparison with un-stratified sampling.

Sy-stamatic sampling, sample mean and its variance. Comparison of systematic sampling with SRS and stratified sampling.

## **UNIT – VII DESIGN OF EXPERIMENTS**

Principles of experimental design. Analysis of DRD, RBD and LSD, missing plot techniques. Factorial experiments with factors at two and three levels. Confounding and partial confounding in factorial experiment.

## **UNIT – VIII INTRODUCTION OF LINEAR PROGRAMMING PROBLEMS (LPP)**

Examples and formulations. Convex sets and its properties. Graphical solution of LPP Simplex Method – Computational Procedure of Simplex method for solution of maximization of LPP – Artificial Variable Technique, Duality in LPP, Duality theorems, Primal – Dual relationships, Dual Simplex method Assignment Problem and transportation problem.

**UNIT – IX MULTIVARIATE NORMAL DISTRIBUTION THEORY**

Marginal and conditional distribution, joint distribution, Linear function of correlated normal variable. Characteristic function of multivariate normal distribution.

**UNIT – X NON – PARAMETRIC METHODS**

Order Statistics

One Sample Tests: Sign test, Willcoxon signed rank test, Kalmogorov, Smirnov one sample test (for sample of equal size) Median test in General two sample problems: Word Wolfewitz run test. Kalmogorov – Smirnov Two sample test (for sample of equal size) Median tests Wilcoxon – mann- Whitney test.

Two sample scale problem: Mood test,

Ansari-Eradley test. Test of randomness based on total number of runs and successive differences.

Students are advised to go through elementary topics i.e. Measures of location/dispersion/Skewness/Kurlosns and correlation and Regression.

**Sd/-  
Secretary & COE  
JK PSC**