ST.JOSEPH'S COLLEGEFORWOMEN (A),VISAKHAPATNAM

VIII SEMESTER STATISTICS TIME: 4 Hrs/Week

ST 8202(3) STATISTICAL INFERENCE II Max. Marks:100

SYLLABUS

Objectives:

CO1: Draw inference about unknown population parameters based on random samples

CO2: Impart knowledge on statistical hypothesis.

CO3: Understand Neyman-Pearson fundamental lemma for testing statistical hypothesis.

CO4: Understand the test procedures MPT, UMPT, LMPT, LRT and SPRT.

CO5: Inculcate various parametric and non-parametric, sequential test procedures.

Learning Outcomes:

LO1: Upon completion of this unit the student will be able to understand the concepts and procedures of testing of hypotheses.

LO2: Generalization of Neymann Pearson-Lemma and different Uniformly Most Powerful Test will also be get acquainted.

LO3: After completing this unit, the student will understand the Neymann structure
and Likelihood ratio test with properties.

LO4: This unit provides and understanding for the student to distinguish between parametric and non-parametric tests in this unit several non-parametric tests will be understand able to the student.

LO5: This unit provides and understanding for the student to distinguish between parametric and non-parametric tests in this unit several non-parametric tests will be understand able to the student.

LO6: At the end of this unit the student will understand the notion of SPRT, and its applications to different distributions.

COURSE:

UNIT I

Fundamental notions of hypothesis testing–Statistical hypothesis, statistical test, Critical region, types of errors, test function, randomised and non–randomised tests, level of significance, power function, Most powerful test, Neyman–Pearson

fundamental lemma, applications of N – P Lemma, Uniformly most powerful tests for one parameter exponential families.

UNIT II

Monotone Likelihood Ratio property, likelihood ratio test, statement of the asymptotic properties of LR statistics with applications, LR test for the mean of normal population, LR test for equality of means of two normal populations, LR test for the equality of means of several normal populations or Bartlett's test statistic.

UNIT III

Concept of sequential estimation, sequential estimation of a normal population. Notions of sequential versus fixed sample size techniques. Wald's sequential probability Ratio test (SPRT) procedure for testing simple null hypothesis against simple alternative. Termination property of SPRT. SPRT procedures for Binomial, Poisson, Normal and Exponential distributions and associate OC and ASN functions.Statement of optimality of SPRT.

UNIT IV

Non parametric tests: Power efficiency, measurement – Nominal, Ordinal, Interval, Ratio Scales. Concept of U statistic with examples.Asymptotic normality of U statistic (statement only). Wilcoxon signed rank test for one sample problem, Kolmogorov – Smirnov test for one sample problem.

UNIT V

Two sample problems based on Wilcoxon signed rank test for paired comparisons, Wilcoxon – Mann – Whitney test, Kolmogorov – Smirnov test, Normal Scores test, Ansary – Bradley test, Kruskal – Wall's test for one way layout problems (k samples), Friedman test for two way layout problem, test of independence based on Spearman's and Kendall' statistics.

Books Recommended

1. Rohatgi, V. K.: An Introduction to probability theory and Mathematical Statistics (Wiley Eastern)

2. Wald, A : Sequential Analysis, Dover Publications

3. Rao, C.R. : Linear Statistical Inference and its applications, John Wiley

4. Gibbons: Non-parametric Statistical Inference (1978)

5. Myles Hollander and Douglas A.W.: Non parametric statistical methods (John Wiley &Sons)

6. Parimal Mukhopadhyay: Mathematical Statistics