B.A/ B.Sc. COURSE IN STATISTICS (OPTIONAL)
W.E.F 2018-19
FOURTH SEMESTER: THEORY PAPER

Total: 50 Hours.

STTH-4: STATISTICAL INFERENCE.

Unit: 1. Point Estimation:
Concept of parameter, estimator, estimate and standard error of an estimator. Consistency - definition and criteria for consistency, Invariance property of consistency, Proof of Sufficient condition for consistency using Chebyshev's inequality. Unbiased ness, Mean squared error as a criterion for comparing estimators. Relative efficiency. Most efficient estimator, Minimum variance unbiased estimator (MVUE). Sufficient statistic. Neyman - Factorization theorem with proof.(discrete case) Measure of information - Fisher information function. Cramer - Rao inequality (without proof) and its applications in the construction of minimum variance unbiased estimators. **10 Hours**

Unit: 2.Methods of estimation:
Maximum likelihood and Moment methods. Standard examples. Illustration for non uniqueness of MLE's. Properties of MLE and MME. Examples illustrating properties of MLE.
10 Hours

Unit: 3.Interval Estimation:
Meaning of confidence interval. Confidence coefficient. Confidence intervals for mean, difference between means for large and small samples,.Confidence intervals for a proportion and difference between two proportions for large samples.
10 Hours

Unit: 4.Testing of Statistical Hypothesis:
Simple and composite hypotheses, Size and power of a test. Most Powerful (MP) test. Uniformly Most Powerful (UMP) test, Statement and proof of Neyman -Pearson Lemma and its use in the construction of Most Powerful test. Standard examples for computation of size and power of a test. Standard examples on NP Lemma.
10 Hours

Unit: 5.UMP and Likelihood Ratio Tests:
Monotone likelihood ratio (MLR) Property. Uniform most powerful (UMP) test. Statement of the theorem of UMP tests for testing one sided hypothesis for distribution with MLR property. Likelihood ratio test (LRT). Large sample approximations to the distribution of the likelihood ratio statistics (without proof).LRT for single mean for normal case (large and small samples).

10 Hours

FOURTH SEMESTER:

STPR-4: PRACTICAL PAPER.
1. Comparison of Estimators by plotting Mean square error.
2. Estimation of Parameters: Maximum Likelihood Method-I
3. Estimation of Parameters: Maximum Likelihood Method-II
4. Estimation of Parameters: Method of Moments.
5. Evaluation of Type-I &Type-II errors and Power of tests (Based on Bonomial, Poisson, Uniform & Normal Distributions).
6. Construction of M.P-tests and computations of power of tests based on Bonomial, Poisson& Normal Distributions.
7. Construction of M.P-tests and computations of power of tests based on Bonomial, Poisson& Normal Distributions.

Books for study:

1. Hogg .R.V.and Craig.A.T(1978):Introduction to Mathematical Statistics.-4/e Macmillan .

2. Goon AM, Gupta M.K., Das Gupta.B.(1991): Fundamentals of Statistics Vol-I World Press Kolkatta.

3. Gupta S.C and Kapoor V.K.: Fundamentals of Mathematical Statistics- Sultan Chand & Sons' publications.

4. Mood.A.M.,Graybill.F A. and Boes D.C.(1974): Introduction to the Theory of Statistics. McGrawHill.

5. Mukyopadhyay.P.(1996) .Mathematical Statistics.-Kolkotta Publishing House.

.**Books for Reference:**

1. Rohatgi.V.K. and A.K.Md.Ehsanes Saleh (2002):An introduction to probability theory and Mathematical Statistics. John Wiley.

2. Murry R.Speigel (1982): Theory & Problems of Statistics, Schaum's publishing Series.

3. P.G.Hoel (1971): Introduction to Mathematical Statistics, Asia publishing house.

4. Dudewicz EJ and Mishra S.N (1980): Modern Mathematical Statistics-John Wiley.

5. Kale B.K(1999):A First Course on Parametric Inference,Narosa.