

**SEMESTER-VI    CORE PAPER-XI**  
**SUBJECT TITLE: STATISTICAL INFERENCE-II**  
**(for the candidates admitted from the academic year 2009-10 onwards)**

**Subject description:** This course introduces the concepts of hypothesis testing

**Goal:** To enable the students to give inference on statistical population based on sample statistics

**Objective:** On completion of the course the students should have gained knowledge on the methods of testing the hypothesis on different distributions and also the nature of statistics to which such test procedure can be used

**Unit-I:** Testing of Statistical hypothesis: Statistical hypothesis -simple and composite hypothesis, null and alternative hypotheses-sample and parameter space –two types of errors – critical region-power a test –Neyman- Pearson Lemma –simple applications

**Unit-II:** Most powerful tests-uniformly most powerful and unbiased tests based on Normal, t, and  $\chi^2$  and F distributions - likelihood ratio criterion –definition and simple applications

**Unit –III:** Test of significance –Asymptotic and exact tests based on Normal, t, and  $\chi^2$  and F distributions with regard to mean, proportion, variance, Standard deviation, coefficient of correlation, regression coefficients, partial and multiple correlation coefficients-Concept of observed significance level.

**Unit-IV:** Contingency table –Test for independence by contingency tables –goodness of fitness tests –tests of homogeneity of variances, correlation and proportions .Test of Normality (application only).

**UNIT-V:** Elementary ideas on distribution –free and non-parametric tests –Run, Median, Sign and Mann Whitney tests (without proof)-Equality of two distributions.

**Books for study**

1. Introduction to Mathematical statistics by Hogg, R.V and Craig, AG (amrend )
2. Introduction to Mathematical statistics by Hoel, P.G (Wiley International)
3. Statistical Methods by Snedecor, G.W and Cochran W. G (oxford and IBH)
4. Introduction to Mathematical Statistics by Brunk .H.D (Gann Co)
5. Practical Non-parametric Statistics by Conover (wiley International)
6. Fundamentals of Mathematical statistics by Guptha S.C and Kapoor V.K(Sulthan chand & sons)

**SEMESTER-VI**  
**CORE PRACTICAL PAPER-IV (USING CALCULATOR)**  
**(for the candidates admitted from the academic year 2009-10 onwards)**

**Problems:**

**UNIT-I**

**Statistical inference-1:**

1. Estimation of parameters of the distribution by the methods of moments and maximum likelihood with regard to discrete and continuous distributions
2. Confidence intervals based on Normal,  $\chi^2$ , t and F distributions
3. Determination of partial and multiple correlation coefficients-Multiple linear regression line and linear prediction involving three variables when the sums of squares and products are given.

**UNIT-II**

**Basic sampling theory:**

1. Estimation of mean and variance of the population and the variance of the estimator of the mean using Simple random procedure.
2. Stratified random sampling –Estimation of mean and variance of the population and of the variance of the estimator of the mean under proportional and optimum allocation.
3. Systematic sampling.

**UNIT-III**

**Design of experiments:**

1. Analysis RBD and LSD lay outs
2. Missing plot techniques in RBD and LSD
3. Analysis of  $2^2$ ,  $2^3$  and  $3^2$  factorial designs with and without confounding.
4. Analysis of covariance with one concomitant variable to RBD.

**UNIT-IV:**

**Statistical inference-II:**

1. Standard Normal and exact tests of significance with regard to mean, variance, proportion, correlation and regression coefficients and partial multiple correlation coefficients
2. Test for homogeneity several variances-Bartlett test

**UNIT-V:**

**Statistical quality control:**

1. Control chart for attributes and variables:  $\bar{X}$ , R, p, np and c charts
2. Single sampling plan for attributes: OC, ATI, AOQ curves.

**Three questions to be answered out of five questions.**

**One question to be asked from each unit.**