

B.A/ B. Sc-II Semester-IV

Paper-I (ST-401)

Time: 3 Hours

M.M.:B. Sc: 40+10*
B.A: 28+7*

* Internal Assessment

Parametric and Non-parametric tests

Note : There will be nine questions in all. Question No.1 will be compulsory covering whole of the syllabus and comprising 5 to 8 short answer type questions. Rest of the eight questions will be set from the four units uniformly i.e. two from each unit. The candidate will be required to attempt five questions in all selecting one question from each unit and the compulsory one. All the questions will carry equal marks except the compulsory question, the distribution of marks for which will be as follows:-

B.Sc.8 marks and B.A. 6 marks.

UNIT-I

Chi-square distribution : Definition, derivation, moment generating function, cumulant generating function, mean, mode, skewness, additive property, conditions for the validity, chi-square test for goodness of fit. Contingency table, coefficient of contingency, test of independence of attributes in a contingency table.

UNIT-II

Student's 't' and Snedecor's 'F' statistics: Definition and derivation of Student's 't', constants of t- distribution, limiting form of t- distribution. Definition & derivation of Snedcor's F-distribution, constants of F-distribution, mode of F-distribution. Relationship between t, f and chi-square distribution.

UNIT-III

Testing for the mean and variance of univariate normal distribution, testing of equality of two means and testing of equality of two variances of two univariate normal distributions. Testing for the significance of sample correlation coefficient in sampling from bivariate normal distribution.

UNIT-IV

Nonparametric Tests: Definition of order statistics. Sign test for univariate and bivariate distribution, run test, median test, Kolmogorov- Smirnov one sample test, Kolmogorov-Smirnov two sample test, Mann Whitney U-test (only applications without derivation).

Books recommended

S. No.	Title of Book	Name of author	Publisher
1.	Introduction to Probability and Its Application	Feller W.	Wiley Publisher
2.	Fundamentals of Statistics, Vol. I	Goon A.M., Gupta & M.K. Dasgupta B.	World Press Calcutta
3.	Random Variable and Probability Distribution	Cramer H.	Cambridge Uni. Press
4.	Fundamentals of Mathematical Statistics	Gupta S.C. & Kapoor V.K.	Sultan Chand & Sons
5.	Practical Nonparametric	W.J. Conover	Wiley Publisher

B.A/ B. Sc-II Semester-IV

Paper-II (ST-402)

Time: 3 Hours

M.M.:B. Sc: 40+10*

B.A: 28+7*

* Internal Assessment

Design of Experiments

Note : There will be nine questions in all. Question No.1 will be compulsory covering whole of the syllabus and comprising 5 to 8 short answer type questions. Rest of the eight questions will be set from the four units uniformly i.e. two from each unit. The candidate will be required to attempt five questions in all selecting one question from each unit and the compulsory one. All the questions will carry equal marks except the compulsory question, the distribution of marks for which will be as follows:-

B.Sc.8 marks and B.A. 6 marks.

UNIT-I

Analysis of variance (ANOVA): Definition and assumptions for ANOVA. Analysis of variance for one-way classification and two-way classifications for fixed effect models with one observation per cell.

UNIT-II

Introduction to design of experiments, terminology: experiment, treatment, experimental unit, blocks, experimental error, replication, precision, efficiency of a design, need for design of experiments, size and shape of plots and blocks. Fundamental principles of design: randomization, replication and local control.

UNIT-III

Completely randomized design (CRD), Randomized Block Design (RBD), their layout, statistical analysis, applications, advantages and disadvantages. Efficiency of RBD relative to CRD.

UNIT-IV

Latin square design (LSD): Layout, statistical analysis, applications, merits and de- merits of LSD. Factorial designs: Definition, advantages and disadvantages.

Books recommended

S. No.	Title of Book	Name of author	Publisher
1.	Design and Analysis Of Experiments	Das M.N. & Giri	Springer Verlage
2.	Linear Models	Searle S.R.	John Wiley & Sons
3.	Linear Estimation And Design of Experiments	Joshi D.D.	Wiley Eastern
4.	Fundamentals of Applied Statistics	Gupta S.C. & Kapoor V.K.	Sultan Chand & Sons

B.A/B. Sc-II

**Paper-III (Practical
ST-403)**

Time: 3 Hours
Sc: 100

Max. Marks: B.

B.A: 60

Practical

Note: Five questions will be set. The candidate will be required to attempt any three.

1. To apply large sample test of significance for single proportion and difference of two proportions and obtained their confidence intervals.
2. To apply large sample test of significance for single mean and to obtained confidence interval.
3. To apply large sample test of significance for difference between two means and standard deviations.
4. To apply t-test for testing single mean and difference between means and to obtain their confidence intervals.
5. To apply paired t-test for difference between two means.
6. To apply Chi-square test for goodness of fit.
7. To apply Chi-square test for independence of attributes.
8. To apply test of significance of sample correlation coefficient.
9. To apply F-test for testing difference of two variances.
10. To apply sign test for given data.
11. To apply Run test for given data.
12. To apply Median test for given data.
13. To apply Mann Whitney U-test for given data.
14. To find standard error of estimate of population mean in case of SRSWR & SRSWOR and comparison of these estimates.
15. To find standard error of estimate of population mean in case of stratified random sampling.
16. To find standard error of estimate of population mean in case of systematic sampling.
19. To perform ANOVA in case of CRD and test whether the treatments/varieties are equally effective.
20. To perform ANOVA for an RBD.
21. To perform ANOVA for an LSD.

Distribution of marks:

	B. Sc.	B.A
Class Record:	10	06
Viva Voce:	10	06
Practical:	80	48