

**SRI VENKATESWARA UNIVERSITY**  
**B.A/B.Sc. DEGREE COURSE IN STATISTICS(WM)**  
**SEMESTER SYSTEM WITH CBCS**

**SEMESTER IV**  
**W.E.F. 2021-2022**

**Semester - IV (CBCS With Maths Combination Common to B.A./B.Sc)**

**Paper IV: Sampling Techniques and Designs of Experiments**

**UNIT-I**

**Theory Of Sample Survey** - Concepts of population, sample, parameters, statistic, sampling distribution standard error. census and sample survey – Differences – sampling and non sampling errors – controlling – steps involved in Large scale sample survey – Limitations of sampling – pilot survey.

**UNIT II**

**Simple Random Sampling** (with and without replacement): Notations and terminology, various probabilities of selection. Random numbers tables and its uses. Methods of selecting simple random sample, lottery method, method based on random numbers. Estimates of population total, mean and their variances and standard errors, important theorems and problems.

**UNIT III**

**Stratified random sampling:** Stratified random sampling, Advantages and Disadvantages of Stratified Random sampling, Estimation of population mean, and its variance. Stratified random sampling with proportional and optimum allocations. Comparison between proportional and optimum allocations with SRSWOR. Important theorems and problems.

**Systematic sampling:** Systematic sampling definition when  $N = nk$  and merits and demerits of systematic sampling - estimate of mean and its variance. Comparison of systematic sampling with Stratified and SRSWOR. Important theorems and problems.

**UNIT IV**

**Analysis of variance:** Analysis of variance(ANOVA) –Definition and assumptions. One-way with equal and unequal classification, Two way classification. Derivations & Problems

## UNIT V

**Design of Experiments:** Definition, Principles of design of experiments, CRD: Layout, advantages and disadvantage and Statistical analysis of Completely Randomized Design (C.R.D).

Randomized Block Design (R.B.D) and Latin Square Design (L.S.D) with their layouts and Analysis, Missing plot technique in RBD and LSD. Efficiency RBD over CRD, Efficiency of LSD over RBD and CRD.

### Practical's - Paper -IV

#### **Sampling Techniques:**

1. Simple random sampling without replacement
2. To show that  $E[\bar{y}] = \bar{y}$  and  $E(s^2) = S^2$  in SRSWOR method.
3. Simple random sampling with replacement.
4. Variance of sample mean in stratified random sampling.
5. Proportional and optimum allocations.
6. To show that  $V(opt) \leq V[prop] \leq V[ran]$

#### **Design of Experiments:**

7. ANOVA - one - way classification with equal and unequal number of observations
8. One way classification with unequal repetitions.
9. ANOVA Two-way classification with equal number of observations.
10. Estimation of single missing observation in RBD
11. Estimation of single missing observation in LSD