SRI VENKATESWSARA UNIVERSITY : TIRUPATI

STATISTICS SYLLABUS

Semester – V (CBCS With Maths Combination Common to BA/BSc)

Paper – V : *Sampling Techniques and Design of Experiments*

3 Hrs/Week

UNIT – I

Sampling Theory :Principal steps in sample surveys - census versus sample survey, sampling and non- sampling errors, advantages of sampling over census and limitations of sampling. Types of sampling: Subjective, probability and mixed sampling methods.

UNIT– II

Simple Random Sampling: simple random sampling , selection procedure of simple random sampling, Estimation of Population mean, Variances in SRSWOR and SRSWR, Advantages and Disadvantages of simple random sampling.

UNIT – III

Stratified random sampling: stratified random sampling, Advantages and Disadvantages of Stratified Random sampling, mean and variance of St.R.S. Allocation of sample size through Proportional and Neyman's or optimum allocation. $V(\text{Ney}) \leq V(\text{Prop}) \leq V(\text{Ran})$,. Systematic Sampling: Systematic sampling When N=nk comparison of their relative efficiencies i.e $V(\text{Sys}) \leq V(\text{St.rs}) \leq V(\text{Ran})$, Advantages and disadvantages of Systematic sampling.

UNIT – IV

Analysis of variance : Definition, assumptions, One-way with equal and unequal classification, Two-way classifications. Design of Experiments :Definition, Principles of design of experiments, CRD: Layout and analysis of Completely Randomized Design (C.R.D)

UNIT –V

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. Efficiencies of these designs.

List of reference books :

1. Fundamentals of Applied Statistics. By S.C.Gupta and V.K.Kapoor. Sultan Chand
2. B.A/B.Sc III Year Paper-IV Statistics- applied Sttistics- Telugu Academic by Prof.K.Srinivasa RAo, Dr.D. Giri,Dr.A.Anand, Dr.V.Papaiah Sastry
3. B.A/B.Sc Statistics Paper-III by DVLN Jogiraju, C.Srikala, Palnati Sudarsan
4. Prayoga Rachana and Visleshana – Telugu Academy.
5. K.V.S. Sarma: Statistics made simple : do it yourself on PC. PHI
6. Anuvartita Sankhyaka sastram – Telugu Academy.

V Semester Practicals: Statistics

Semester – V (CBCS With Maths Combination Common to BA/BSc)

Paper V: Sampling Techniques and Design of Experiments

2 Hrs/Week

1. Estimation of population mean, Variance by SRSWOR and SRSWR Method and verification.
2. Allocation of Sizes through Proportional and optimal allocations
3. Showing of $V(\text{Opt}) \leq V(\text{Prop}) \leq V(\text{Ran})$
4. showing of $V(\text{sys}) \leq V(\text{st.rs}) \leq V(\text{Ran})$.
5. ANOVA for one – way classification with equal and unequal of observations
6. ANOVA for Two – way classification.
7. Analysis of CRD
8. Analysis of RBD
9. Missing plot technique in RBD
10. Analysis of LSD
11. Missing plot technique in LSD

Note : The above practical are to be done using M S Excel Package where ever it is possible (Compulsory)

THREE YEAR B.A/BSC. DEGREE EXAMINATION

CBCS – FIFTH SEMESTER

Part - II - STATISTICS (WM)

Paper V : Sampling Techniques and Design of Experiments

Revised syllabus w.e.f. 2017 - 18

MODEL PAPER

Time : 3 Hours **Max Marks : 75**

PART - A

Answer any **FIVE** of the following questions.
Each question carries **5** marks **5X5 = 25Marks**

1. Explain about sampling frame?
2. Describe about Response and Non Response errors?
3. A population has the values -5,10,3,-2, and 11. Then draw simple random samples of size 3 by without replacement method and show that $E(\bar{y}) = \bar{Y}$
4. What is the need for having stratification?
5. How do you say that systematic sampling becomes more efficient than simple random sampling when $S_{wsy}^2 \leq S^2$
6. Mention the Merits and Demerits of Two way classification?
7. How do you construct Latin square design?
8. Define the terms Treatments, Blocks and Experimental Error with examples?

PART – B

Answer **ONE** question from each unit.

Each question carries 10 marks. **5x10 = 50 Marks**

UNIT – I

9. Discuss various steps involved in conducting large scale sample survey?

(OR)

10. What do you meant by sampling and Non Sampling errors? How do you control these errors?

UNIT – II

11. Describe about SRSWOR and SRSWR methods? Give the properties and draw backs of these two methods?

(OR)

12. In SRSWOR method prove that $E(s^2) = S^2$ and $V(\bar{y}) = \frac{N-n}{N} \frac{S^2}{n}$

UNIT – III

13. In Stratified Random Sampling , derive the formula for variance of sample mean and variance for unbiased estimate of the population total?

(OR)

14. With your usual notations Prove that V(Opt) ≤ V(Prop) ≤ V(Ran)?

UNIT – IV

15. Define Analysis of variance? Mention the properties and applications involved in ANOVA?

(OR)

16.Describe Analysis of variance of Two Way classification ?

UNIT – V

17. How do you estimate single missing observation in Latin Square Design?

OR

18. Derive Relative Efficiency of LSD over RBD and CRD?

SRI VENKATESWARA UNIVERSITY : TIRUPATI

STATISTICS SYLLABUS

Semester – V (CBCS With Maths Combination Common to BA/BSc)

Paper – VI : Statistical Quality Control and Reliability

3 Hrs/Week

UNIT – I

Statistical Quality Control : Definition, Importance of SQC in industry. Causes of variation-chance and assignable causes, Process and Product control, Importance of Normal distribution, 3σ control limits, specification limits and Natural tolerance limits.

UNIT– II

Shewart control charts – Variable Control Charts- $\bar{X}$ and R-chart, $\bar{X}$ and S- chart Attribute type of charts - np- chart(No.of defectives) , p- chart(Proportion of defective)with and C-Chart, its applications.

UNIT – III

Acceptance sampling plans: Definition, Types of Accepting sampling plans, Merits and demerits of Acceptance sampling plans, applications, Concept of AOQ, AQL and LTPD, ASN, ATI, AOQL. Producers risk and consumer's risk.

UNIT – IV

Single and Double sampling plans for attributes and derivation of their OC and ASN functions. Design of single and double sampling plans for attributes

UNIT – V

Reliability: Meaning and concept of reliability, Reliability measures –Failure Density, Failure Rate or Hazard function , Probability of Failure, Mean Time to Failure(MITF), Mean Time Between Failures(MTBF), Exponential distribution as life model, its memory- less property.

List of reference books :

1. Fundamentals of Applied Statistics. By V.K.Kapoor and S.C.Gupta ,Sultan Chand
2. Reliability and life testing by S.K.Sinha, Wiley Eastern
3. Statistical Quality Control by R.C.Gupta:
4. B.A/B.Sc III Year Paper-IV Statistics- applied Sttistics- Telugu Academic by Prof.K.Srinivasa RAo, Dr.D. Giri,Dr.A.Anand, Dr. V.Papaiah Sastry
5. B.A/B.Sc Statistics Paper-IV Statistics, Quality, Reliability and OR by DVLN Jogiraju, C.Srikala, Palnati Sudarsan

V Semester Practicals: Statistics

Semester – V (CBCS With Maths Combination Common to BA/BSc)

Paper VI: Statistical Quality Control and Reliability

2 Hrs/Week

1.Construction of Mean($\bar{X}$) and Range(R) Charts

2. Construction of Mean($\bar{X}$) and S.D(s) Charts.

3.Construction of np- Chart (No.of defectives)

4.Construction of p-chart (Proportion of defectives) with fixed sample size

5. Construction of p- Chart (Proportion of defectives) with variable sample size

6.Construction of C Chart (No.of defects)

7.Construction of OC curves

8. Construction of ASN curve

9.Calculation of Failure density, Failure Rate Reliability, Probability of Failure

Note : The above practical are to be done using M S Excel Package where ever it is possible (Compulsory)

THREE YEAR B.A/BSC. DEGREE EXAMINATION

CBCS – FIFTH SEMESTER

Part - II - STATISTICS (WM)

Paper – VI : Statistical Quality Control and Reliability

Revised syllabus w.e.f. 2017 - 18

MODEL PAPER

Time : 3 Hours **Max Marks : 75**

PART - A

Answer any **FIVE** of the following questions.
Each question carries **5** marks **5X5 = 25Marks**

1. Give the importance of SQC in industries?
2. Explain about Process and Product control?
3. Describe about 3 σ control limits in SQC?
4. Distinguish between control charts for variables and attributes?
5. Discuss about producers risk and consumers risk?
6. Mention the Merits and Demerits sampling inspection?
7. Define about Operating characteristic curve and its interpretation?
8. Define the terms Failure Rate and Mean Time to Failure Rate with examples?

PART – B

Answer **ONE** question from each unit.

Each question carries 10 marks. **5x10 = 50 Marks**

UNIT – I

9. Describe the importance of normal distribution in SQC?

(OR)

10. Explain about Specification, Tolerance limits?

UNIT – II

11. Describe the Construction of $\bar{X}$ and R charts?

(OR)

12. The following data is related to defectives of 15 samples each containing 750 items then construct fraction defectives chart and give suitable comment.

250, 22, 138,456, 18, 322, 74, 154, 204, 35, 410, 84, 322, 38, 102,

UNIT – III

13. Explain the need for having sampling inspection?

(OR)

14. Describe about Acceptance Quality Level, Lot tolerance percent defective and Average Outgoing Quality Level.

UNIT – IV

15. Describe the construction of Operating Characteristic Curve and also give its properties?

(OR)

16.Deduce the construction and interpretation of Double Sampling Plan?

UNIT – V

17. Define reliability and mention advantages of reliability programme?

OR

18. Derive Lack of memory property of Exponential Distribution in the light of reliability theory.