SRI VENKATESWARA UNIVERSITY
B.A. DEGREE COURSE IN STATISTICS
SEMESTER SYSTEM WITH CBCS
SEMESTER V
(For Non - Mathematics Combination)
Skill Enhancement Courses (SECs) for Semester V
(w.e.f 2022-23) (Syllabus-Curriculum)

Structure of SECs for Semester – V

Year	Sem	Paper	Title	No. of Theory Hours per Week	IE Marks	EE Marks	Total	credits
III	V	6A	Applied Statistics	3	25	75	100	3
			Practicals	3	-	50	50	2
		7A	Sampling Techniques & Design of Experiments	3	25	75	100	3
			Practicals	3	-	50	50	2

Course Code :

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COURSE 6A: APPLIED STATISTICS

(Skill Enhancement Course(Elective),
05 Credits
Max.Marks: Theory :100 + Practicals: 50

Unit – I

Vital statistics – meaning, definition, uses - sources of vital statistics - Different Death Rates(or) Mortality Rates – Fertility and Fecundity – Different Fertility (or) Birth rates.

Unit – II

Measurement of Population growth – Different Reproductive rates- CGR , Vital index, NRR,GRR - Life Table, Components with interrelation ships (With out Proof) - Abridged Life Table – Simple Problems.

Unit – III

Time Series – Definition – Uses - Components of Time Series- Trend – Method of Moving Averages - Linear Trend - Parabolic Trend – Simple problems- Seasonal Indices – Definition –Measurement of Seasonal Indices -Method of Simple Averages - Ratio to Moving Averages - Ratio to Trend

Unit – IV

Index Numbers: Introduction, Applications and Limitations of index numbers, Problems involved in the construction of index numbers, Simple and weighted index numbers, Criteria of good index number, Chain base and fixed base index numbers. Construction of Cost of living index numbers

Unit – V

Statistical Quality Control(SQC) - Definition – Uses -, Chance and Assignable causes of variation - Natural Tolerance, Specification and Control Limits – Construction of $\overline{X}$ & R Charts - Defectives chart(np – Chart) - Fraction Defective Chart for fixed sample size(p – Chart) – Defects Chart (C – Chart) – Simple Problems.

Reference Books:

1.Anuvarthita Sankyaka Sastram – Telugu academy book.

2.Applied Statistics – V.K.Kapoor & S.C Gupta

3.Applied statistics – Parimal Mukhopadhyay

4. Fundamentals of statistics – S.C. Gupta.

5.Fundamentals of statistics – Goon Gupta and Das Gupta

Note: Training shall be on establishing formulae in Excel cells and derive the results. The excel output shall be exported to MS word for writing inference.

Course Learning Outcomes:

Paper VI: Applied Statistics

1. Students would be able to know about the definition, uses of vital statistics and its sources, Various mortality and fertility rates, Life tables-its construction and uses.

2. Students would be able to learn about Time series and its components, Determination of trend by least squares, moving averages methods and to determine seasonal indices by Ratio to moving average, ratio to trend and link relative methods.

3. Students would be able to learn about Importance of statistical quality control in industry, Construction of control charts for measurable variables, attributes and to draw conclusions.

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Course 6A: Applied Statistics

Practicals :

1. Different Mortality Rates
2. Different Birth Rates .
3. Gross and Net Reproduction Rates
4. Life Table (for 2 years only)
5. Trend by odd period moving averages
6. Trend by even period moving averages
7. Straight line Trend
8. Construction of Mean ($\overline{X}$) & Range(R) Charts
9. Fraction Defective Chart(P - Chart)
10. Defects Chart (C- Chart)

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SEMESTER V
Course 6A: Applied Statistics
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Time:3 Hours **MODEL QUESTION PAPER** **Max.Marks:75**

PART - A

Answer any **FIVE** of the following questions. Each question carries 5 Marks

5 X 5 = 25M

1. Define Vital events and vital statistics with examples ?
2. Describe about total fertility rate?
3. Explain about vital index ?
4. Give the equation for measurement of population growth?
5. Explain different models between the components of time series ?
6. Define seasonal variations and its uses ?
7. Describe about various simple index numbers?
8. Index numbers are economic barometers of a country- Discuss?
9. Explain about process control and product control ?
10. Describe the construction of C- Chart ?

PART-B

Answer **ALL** questions. Each question carries 10 Marks 5X10=50M

UNIT – I

11. Describe the various sources of vital statistics?

(OR)

12. Describe about various mortality rates?

UNIT – II

13. Explain about Gross and Net reproduction rates along with interpretations?

(OR)

14. Define life table? Explain various components of life table along with inter relationships?

UNIT – III

15. Explain various components of time series with examples?

(OR)

16. Fit a straight line trend and find out trend values from the following data?

Year	2010	2011	2012	2013	2014	2015	2016
Production (in Tones)	10	14	21	34	45	40	52

UNIT – IV

17. Explain various problems involved in the construction of Index numbers ?

(OR)

18. Prove that Fisher Index Number satisfies both time and factor reversal tests?

UNIT – V

19. Explain about specification, Natural tolerance and control limits ?

(OR)

20. Describe the construction of Fraction defectives(p-Chart) ?

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COURSE 7A: SAMPLING TECHNIQUES & DESIGN OF EXPERIMENTS

(Skill Enhancement Course(Elective), 05 Credits
Max.Marks: Theory :100 + Practicals: 50

(Under CBCS New Regulations w.e.f. 2020-21)

Unit – I

Sampling versus census survey – Sampling, Non- Sampling Errors and their control - Limitations of sampling - Types of Sampling - Principal steps involved in Large Scale Sample Survey.

Unit – II

Simple Random Sampling – SRSWOR and SRSWR Methods –Differences - Methods to draw Simple random samples - Random number tables and Lottery Methods – Theorem on Sample mean is an unbiased estimate of population mean in SRSWOR and SRSWR Methods – simple Problems .

Unit – III

Stratified Random Sampling – Definition- Properties - Definitions of proportional and Optimum allocations – Systematic Sampling - Definition - Properties and Demerits.

Unit – IV

Analysis of variance(ANOVA) – Definition – Assumptions – Uses - One -way Analysis with equal and unequal observations - Two way Analysis – Merits and Demerits

Unit – V

Design of Experiments - Definition, Principles of experimentation - Completely Randomized Design(C.R.D) – Definition, Layout, advantages and Disadvantages and Statistical analysis of CRD - Randomized Block Design (R.B.D) - Definition, Layout, advantages and disadvantages, Statistical analysis of RBD - Latin Square Design

(L.S.D) - Definition, Layout, advantages and disadvantages, Statistical analysis of LSD.

***Reference Books**:*

1.Anuvarthita Sankyaka Sastram – Telugu academy book.

2.Applied Statistics – V.K.Kapoor & S.C Gupta

3. Sampling Techniques – W.Cochran

4. Design of Experiments – M.N.Das & N.C. Giri

5. Fundamentals of statistics – S.C.Gupta

Note: Training shall be on establishing formulae in Excel cells and derive the results. The excel output shall be exported to MS word for writing inference.

Course Learning Outcomes:

Paper VII : Sampling Techniques & Design of Experiments

1. Students would be able to know about the sampling methods and different types of sampling methods, to estimate their population mean, population total, their variances. They also study about their advantages and disadvantages.

2. Students would be able to know about Analysis of Variance, technique of one way and two way classifications.

3. Students would be able to learn about design of experiments and principles of experimentation. They would also be able to know about Completely Randomised design(CRD), Randomised block design(RBD), Latin square design(LSD) their analysis and comparison of their relative efficiencies.

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Course 7A: Sampling Techniques & Design of Experiments

Practicals :

1.Simple random sampling without replacement.

2. Simple Random Sampling with replacement

3. Variance of Stratified random sampling

4. Proportional and optimum allocations.

5. One-Way Classification with equal repetitions

6. One-Way Classification with un equal repetitions

7. Two -Way Classification -

8. Completely Randomised Design

9. Randomized Block Design

10. Latin Square Design

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Skill Enhancement Course(Elective)
COURSE 7A: SAMPLING TECHNIQUES & DESIGN OF EXPERIMENTS

(Scientific calculators are allowed)

Time:3 Hours **MODEL QUESTION PAPER**

Max.Marks:75

PART - A

Answer any **FIVE** questions. Each question carry **FIVE** marks **5X5 =25M**

1. Discuss about census and sample survey?
2. Define about sampling frame?
3. Distinguish between SRSWOR AND SRSWR methods?
4. A population contains the values 10,-2,16,-5,24. Draw Simple random samples of size 2 by without replacement method and show that Sample mean becomes an unbiased estimator of population mean?
5. Give the properties of systematic sampling?
6. Define the terms treatments and experimental unit?
7. Give the merits and demerits of one-way classification?
8. Define about design of experiment?
9. Give the lay out of CRD?
10. Give the differences between RBD and LSD ?

PART – B

Answer all questions and each question carries 10 marks **5 x 10 = 50M**

UNIT - I

11. Explain sampling and Non Sampling Errors? How do you control them?

(OR)

12. Describe various steps involved in large scale sample survey?

UNIT - II

13. Explain about Lottery and random number table methods to draw simple random samples method?

(OR)

14.In SRSWOR method prove that sample mean becomes an unbiased estimator of population mean?

UNIT – III

15. Explain Stratified random sampling method and give its properties?

(OR)

16.Give the differences among simple, stratified and systemic sampling methods?

UNIT – IV

17. Define analysis of variance with an example? Mention its assumptions?

(OR)

18. Give the analysis of variance of two way classification ?

UNIT – V

19. Describe about principles of experimentation ?

(OR)

20. Define LSD? Give the assumptions and lay out of LSD?