

**SRI VENKATESWARA UNIVERSITY**  
**CBCS B.A.(Non-Maths) Statistics Course Structure**  
**W.E.F.2017-18**  
**3<sup>rd</sup> YEAR - VI SEMESTER**  
**STATISTICS**

Year	Sem	Paper	Subject	Hrs	Cridets	IA	EA	Total
3	VI	VII	<b>Elective(A)</b>					
			Analysis of variance and Vital Statistics	3	3	25	75	100
			LAB	2	2	-	50	50
		<b>Cluster Elective (A)</b>						
		VIII	A-I : Applied Statistics	3	3	25	75	100
			A-II :Statistical Quality Control and Operations Research	3	3	25	75	100
			A-III : Numerical Analysis	3	3	25	75	100
			A-I : LAB	2	2	-	50	50
			A-II : LAB	2	2	-	50	50
			A-III : LAB	2	2	-	50	50

## **SRI VENKATESWARA UNIVERSITY**

### **STATISTICS SYLLABUS**

Semester – VI (CBCS With Non-Maths Combination Common to BA)

Elective Paper – VII(A) : ANALYSIS OF VARIANCE AND VITAL STATISTICS

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#### **UNIT – I**

**Analysis of variance** : Definition, Assumptions, One-way with equal and unequal classification, Two-way classifications.

#### **UNIT – II**

**Design of Experiments** : Definition, Terminology in experimental design, Principles of design of experiments- Replication, Randomization and Local control, Completely Randomized Design(CRD): Layout, Advantages and analysis of Completely Randomized Design (C.R.D)

#### **UNIT –III**

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.

#### **UNIT – IV**

**Vital Statistics:** Introduction, Uses of vital statistics, Methods of obtaining vital statistics, Measurement of mortality: Crude death rate(CDR), Specific death rates(S.D.R) and Standardized death rate(St.D.R) , Measurements of Fertility: Crude Birth Rate(CBR), General Fertility Rate (GFR), Specific Fertility Rate (SFR) and Total Fertility Rate(TFR).

#### **UNIT -V**

**Population growth rates:** Pearl's vital index, Grass reproduction rate (GRR) and Net reproduction rate (NRR). Life Table- Assumptions, Description and construction of life table uses of life table, Abridged Life Table.

### **List of reference books :**

1. Fundamentals of Applied Statistics. By S.C.Gupta and V.K.Kapoor. Sultan Chand
2. III Year B.A/B.Sc Paper-III applied Statistics-1 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.

## **STATISTICS PRACTICALS**

Semester – VI (CBCS With Non-Maths Combination Common to BA)  
Elective Paper – VII(A) : ANALYSIS OF VARIANCE AND VITAL STATISTICS

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1. ANOVA – one way classification with equal number of observations
2. ANOVA – one way classification with unequal number of observations
3. A NOVA- Two way classification with equal number of observations.
4. Analysis of CRD.
5. Analysis of RBD
6. Analysis of RBD with missing observation
7. Analysis of LSD
8. Analysis of LSD with missing observation
9. Calculation of mortality rates
10. Calculation of Fertility rates
11. Calculation of NRR and GRR
12. Construction of Life Table

**SRI VENKATESWARA UNIVERSITY**  
**STATISTICS MODEL QUESTION PAPER**  
Semester – VI (CBCS With Non-Maths Combination Common to BA)  
Elective Paper – VII(A) : ANALYSIS OF VARIANCE AND VITAL STATISTICS  
(w.e.f. 2017-18)  
(Scientific calculators and statistical tables are allowed)

**Time:3 Hours**

**Max.Marks:75**

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**PART - A**

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

1. Define ANOVA? State the assumptions?
2. Give Lay-Out of CRD?
3. Define (i) Treatment (ii) Block with examples
4. Describe the Lay-Out of RBD? Give its Advantages?
5. Define vital statistics? Give its Uses
6. Define abridged life table?
7. State the measures of population growth?
8. What are the components of life table?

**PART-B**

Answer **ALL** questions. Each question carries 10 Marks

5X10=50M

**UNIT - I**

9. Explain ANOVA of Two Way classification?

OR

10. Three varieties of coal were analyzed by four chemists and the ash-content in the varieties was found to be as under. Do the varieties differ significantly in their ash content.

Varieties	Chemists			
	I	II	III	IV
A	8	5	5	7
B	7	6	4	4
C	3	6	3	4

**UNIT – II**

11. Explain the basic principles of experimental design?

OR

12. Explain Analysis of variance of CRD

**UNIT - III**

13. Write down the ANOVA table of LSD ?

OR

14. Define RBD and write layout of RBD ?

**UNIT - IV**

15. Explain various rates of fertility?

OR

16. Explain the mortality rates?

**UNIT - V**

17. Explain NRR and GRR?

OR

18. Fill the following life table

Age	$l_x$	$d_x$	$q_x$	$p_x$	$L_x$	$T_x$	$e_x^0$
4	95000	500	?	?	?	4050300	?
5	?	400	?	?	?	?	?

**SRI VENKATESWARA UNIVERSITY**  
**STATISTICS SYLLABUS**  
Semester – VI (CBCS With Non-Maths Combination Common to BA)  
Cluster Elective Paper – VIII(A-I) : APPLIED STATISTICS

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**UNIT – I**

**Time series** : Introduction, Components of Time Series, Analysis of time series, Uses of time series, Measurement of trend : Graphic method, Semi averages, Moving averages and trend lines by straight line and parabola.

**UNIT – II**

**Seasonal Indices** : Simple average method, Ratio to moving average method, Ratio to trend method and Link relatives method.

**UNIT – III**

**Index numbers**: Introduction, Applications and Limitations of index numbers, Problems involved in the construction of index numbers, Simple and weighted index number, Criteria of good index number, Fisher good index number.

**UNIT -IV**

Chain base and fixed base index numbers, Base shifting and Splicing of index numbers. Cost of living index numbers: Definition, Uses, Construction.

**UNIT – V**

**Official Statistics**: Functions and organization of CSO and NSSO. Agricultural Statistics, area and yield statistics. National Income and its computation, Utility and difficulties in estimation of national income.

**List of reference books:**

1. Gun, A.M., Gupta, M.K. and Dasgupta, B. (2008): Fundamentals of Statistics, Vol. II, 9th Edition World Press, Kolkata.
2. Gupta, S. C. and Kapoor, V.K. (2008): Fundamentals of Applied Statistics, 4<sup>th</sup> Edition(Reprint), Sultan Chand & Sons
3. B.A/B.Sc III Year Paper-III Statistics- applied Statistics- Telugu Academic by Prof.K.Srinivasa Rao, Dr.D. Giri, Dr.A.Anand, Dr.V.Papaiah Sastry
4. K.V.S. Sarma: Statistics Made Simple: do it yourself on PC. PHI.

## **STATISTICS PRACTICALS**

Semester – VI (CBCS With Non-Maths Combination Common to BA)  
Cluster Elective Paper – VIII(A-I) : APPLIED STATISTICS

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1. Calculation of trend values by Moving Average Method(Odd & Even Period)
2. Calculation of trend values by Linear Trend method
3. Calculation of seasonal indices by Simple Average Method
4. Calculation of seasonal indices by Ratio to Moving Average Method
5. Calculation of seasonal indices by Ratio – to- Trend Method
6. Calculation of seasonal indices by Link Relatives Method
7. Calculation of simple index numbers
8. Calculation of Weighted index numbers
9. Calculation of Different weighted index numbers
10. Construction of Fisher Good Index number
11. Construction of Cost of living index number
12. Calculation of Fixed base index number
13. Calculation of Chain base index number.

**SRI VENKATESWARA UNIVERSITY**  
**STATISTICS MODEL QUESTION PAPER**  
Semester – VI (CBCS With Non-Maths Combination Common to BA)  
Cluster Elective Paper – VIII(A-I) : APPLIED STATISTICS  
(w.e.f. 2017-18)  
(Scientific calculator and statistical tables are allowed)

**Time: 3 Hours**

**Max.Marks:75**

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**PART - A**

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

1. Write uses of time series ?
2. Define time series and write components of time series ?
3. Explain simple average method of finding seasonal indices ?
4. Define index numbers and mention its limitations ?
5. Prove that fisher index number is a good index number ?
6. Explain base shifting of index number ?
7. Define Cost of living index number and mention its uses ?
8. Write functions of CSO ?

**PART-B**

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

**UNIT - I**

9. Explain 4 yearly moving average method for finding trend values ?

Or

10. Explain components of time series ?

**UNIT - II**

11. Describe Ratio to trend method for finding seasonal indices ?

Or

12. Explain Link relatives method for finding seasonal indices ?

### UNIT - III

13. Calculate weighted index numbers for the following data?

Item	2006		2009	
	Price	Quantity	Price	Quantity
A	10	10	5	20
B	8	10	6	20
C	6	20	9	30
D	4	20	8	40

**Or**

14. Explain problems involved in the construction of index numbers ?

### UNIT - IV

15. Explain chain base and Fixed base index numbers ?

**Or**

16. Explain splicing of index numbers ?

### UNI - V

17. Explain National income and its uses ?

**Or**

18. Describe uses and assumptions of CSO and NSSO ?

## SRI VENKATESWARA UNIVERSITY

### STATISTICS SYLLABUS

Semester – VI (CBCS With Non - Maths Combination Common to BA)

Cluster Elective Paper – VIII(A-II): STATISTICAL QUALITY CONTROL AND OPERATIONS RESEARCH

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#### 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,  $3\sigma$  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), C-Chart(No.of defects) and its applications.

#### UNIT - III

**Transportation Problem:** Introduction, Transportation Table, General Transportation problem, Initial basic feasible solution by North West Corner Rule, Least cost method and Vogel's Approximation Method (VAM), Un-Balanced Transportation Problem, Maximization Transportation Problem.

#### UNIT - IV

**Assignment problem:** Introduction, Mathematical formulation of the problem, Optimal solution by Hungarian method. Un balanced assignment problem and Maximization case in assignment problem

#### UNIT - V

**Sequencing Problem:** Introduction, Principle assumptions, Basic terms used in sequencing, Optimum Sequence Algorithm(Johnston Algorithm), processing n Jobs through two machines, Processing n Jobs through three machines and K machines

## Reference Books:

1. Applied Statistics: S.C.Guptha and V.K. Kapoor
2. Statistics Made simple Do it yourself on PC By K.V.S. Sarma
3. B.A/B.Sc III Year Paper-IV Statistics- applied Statistics- Telugu Academic by Prof.K.Srinivasa Rao, Dr.D. Giri, Dr.A.Anand, Dr.V.Papaiah Sastry
4. Taha, H. A. (2007): Operations Research: An Introduction, 8th Edition, Prentice Hall of India.
5. KantiSwarup, Gupta, P.K. and Manmohan (2007): Operations Research, 13th Edition, Sultan Chand and Sons.
6. S.Kalavathi, Operations Research, 2<sup>nd</sup> Edition, Vikas

## **STATISTICS PRACTICALS**

Semester – VI (CBCS With Non - Maths Combination Common to BA)  
Cluster Elective Paper – VIII(A-II): STATISTICAL QUALITY CONTROL AND OPERATIONS  
RESEARCH

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1. Construction of Mean( $\bar{X}$ ) and Range(R) Charts
2. Construction of np- Chart (No.of defectives)
3. Construction of p-chart (Proportion of defectives) with fixed sample size
4. Construction of C Chart (No.of defects)
5. Solution of TP by North West Corner Rule to find IBFS
6. Solution of TP by Least Cost Method to find IBFS
7. Solution of TP by VAM to find IBFS
8. Solution of Unbalanced TP
9. Solution of Assignment problem by Hungarian Method
10. N jobs through two machines
11. N jobs through three machines

**SRI VENKATESWARA UNIVERSITY**  
STATISTICAL MODEL QUESTION PAPER  
Semester – VI (CBCS With Non-Maths Combination Common to BA)  
Cluster Elective Paper – VIII(A-II): STATISTICAL QUALITY CONTROL AND OPERATIONS  
RESEARCH  
(w.e.f. 2017-18)  
(Scientific calculator and statistical tables are allowed)

**Time: 3 Hours**

**Max.Marks:75**

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**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. Describe about  $3\sigma$ - control limits in SQC?
3. Explain construction of C- chart?
4. Define the terms feasible solution, optimum solution and Un balanced TP ?
5. Explain North west corner rule for finding IBFS?
6. Write mathematical formulation of assignment problem?
7. Write assumptions of sequencing problem?
8. Define sequencing problem and Explain (i) Total Elapsed Time (ii) Idle time

**PART – B**

Answer all questions. 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 on the production process?

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

**UNIT – III**

13. Define transportation problem? How to find IBFS using VAM

(OR)

14. Determine an IBFS to following TP by Least cost method?

Origins	Destinations				Supply
	$D_1$	$D_2$	$D_3$	$D_4$	
$O_1$	6	4	1	5	14
$O_2$	8	9	2	7	16
$O_3$	4	3	6	2	5
Demand	6	10	15	4	

**UNIT – IV**

15. Describe the Hungarian method for solving the Assignment problem?

(OR)

16. Solve the following assignment problem?

		J o b s				
M A C H I N E S		1	2	3	4	5
	A	10	3	3	2	8
	B	9	7	8	2	7
	C	7	5	6	2	4
	D	3	5	8	2	4
	E	9	10	9	6	10

**UNIT – V**

17. Describe the procedure for processing n jobs through three machines?

OR

18. There are five jobs each of which must go through the two machines A and B in the order AB. Processing times are given below. Determine a sequence for five jobs that will minimise the total elapsed time

Job	1	2	3	4	5
Machine A	5	1	9	3	10
Machine B	2	6	7	8	4

## SRI VENKATESWARA UNIVERSITY

### STATISTICS SYLLABUS

Semester – VI (CBCS With Non- Maths Combination Common to BA)

Cluster Elective Paper – VIII(A-III) : NUMERICAL ANALYSIS

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#### UNIT – I

**Finite Differences:** Definitions of operators  $\Delta, \nabla$  & E- Properties-Relationship among operators-Difference Table- Uses- Estimation of single and Two Missing values- Newton's Binomial expansion rule- Problems

#### UNIT – II

**Interpolation and Extrapolation-** Assumptions- uses- Newton's forward formula- Newton's back ward formula- Interpolation at unequal intervals- Divided differences-properties- Newton's divided differences formula- Lagrange's formula- Problems(With out proof)

#### UNIT – III

**Central Differences:** Uses – Gauss Forward and Backward formulae- Sterling's formula- Bessel's formula- Laplace Everett's formula - Problems(With out proof)

#### UNIT – IV

**Numerical Differentiation:** First and Second order derivatives-Newton,s forward and Back ward Differentiation formulae-, Gauss Forward and Backward differentiation formulae- Sterling's- Bessel's- Laplace Everett's differentiation formulae- Problems(With out proof)

#### UNIT – V

**Numerical Integration:** Importance- General Quadrature rule- Trapezoidal Rule- Simpson's - 1/3 Rule- Simpson's -3/8 Rule –Weddle's Rule - Problems(With out proof)

### List of reference books:

1. Statistical Methods by S.C.Gupta,
2. Gupta, S. C. and Kapoor, V.K. (2008): Fundamentals of Mathematical Statistics, New Edition(Reprint), Sultan Chand & Sons
3. Statistics and Numerical methods by Dr. A. Singaravelu, ARS Publications.

## **STATISTICS PRACTICALS**

Semester – VI (CBCS Non- Maths Combination Common to BA)  
Cluster Elective Paper – VIII (A-III) : NUMERICAL ANALYSIS

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1. Missing values by Binomial Expansion method
2. Newton's forward formula
3. Newton's back ward formula
4. Lagrange's formula
5. Gauss forward central formula
6. Gauss backward central formula
7. Sterling's central difference formula
8. Bessel's central difference formula
9. Laplace-Everett's central difference formula
10. Gauss forward differentiation formula
11. Gauss backward differentiation formula
12. Sterling's differentiation formula
13. Bessel's differentiation formula
14. Laplace-Everett's differentiation formula
15. Trapezoidal Rule
16. Simpson's  $\frac{1}{3}$  and  $\frac{3}{8}$  rule

**SRI VENKATESWARA UNIVERSITY**  
**STATISTICS MODEL QUESTION PAPER**  
Semester – VI (CBCS With Non-Maths Combination Common to BA)  
Cluster Elective Paper – VIII(A-III) : NUMERICAL ANALYSIS  
(w.e.f. 2017-18)

(Scientific calculators and statistical tables are allowed)

**Time:3 Hours**

**Max.Marks:75**

**PART- A**

Answer any **FIVE** questions. Each question carries **FIVE** marks

5 X 5 = 25 Marks

1. Define the operators  $\Delta$ ,  $\nabla$  and  $E$
2. Evaluate  $\left(\frac{\Delta}{E}\right)^2 x^2$
3. Define interpolation. Give its assumptions ?
4. State the divided difference properties
5. Define central differences ? Give its uses
6. State Gauss forward and Backward formula.
7. Define Numerical differentiation ?
8. Define Numerical integration and give its importance ?

**PART -B**

Answer all questions. Each question carries 10 marks.

**5x10 = 50 Marks**

**UNIT - I**

9. Define finite differences ? Write down tables of forward and backward differences

(OR)

10. Estimate the missing value in the following table

x	:	1	2	3	4	5
f(x)	:	7	--	13	21	37

**UNIT - II**

11. State Newton's divided difference formula and Lagrange's formula for interpolation?

(OR)

12. Use Newton's forward formula to find the value of  $y$  when  $x = 2.75$  from the following data

$x$	:	2.5	3.0	3.5	4.0	4.5
$Y$	:	24.145	22.043	20.225	18.644	17.262

### UNIT - III

13. State Gauss forward and Backward difference formula, Sterling's formula and Bessel's formula.

(OR)

14. From the following table find the value of  $y$  when  $x = 338$  using Gauss forward formula

$x$	:	310	320	330	340	350
$y$	:	25	26	27	25	26

### UNIT - IV

15. Write the  $dy/dx$ ,  $d^2y/dx^2$  to the newton's forward and backward formula.

(OR)

16. Find  $f'(1.5)$  and  $f''(1.5)$  from the following table by Newton's forward formula

$x$	:	1	2	3	4	5
$f(x)$	:	4	26	58	112	466

### UNIT - V

17. Write down the formulae for Trapezoidal rule, Simpson's  $1/3$  rd and  $3/8$  rule for numerical integration.

(OR)

18. Calculate by Simpson's  $\frac{1}{3}$ rd rule an appropriate value of  $\int_{-3}^3 x^4 dx$  by taking seven distant ordinates.