

SRI VENKATESWARA UNIVERSITY: TIRUPATI

SEMESTER-IV - W.E.F. 2024-25

STATISTICS MINOR

COURSE 3: ANALYSIS AND DESIGN OF EXPERIMENTS

Theory

Credits: 3

3 hrs/week

I. Learning Outcomes

After successful completion of the course students will be able to:

1. To acquaint with the role of statistics in different fields with special reference to agriculture.
2. Learn to apply the one of the design of experiment to agricultural fields.
3. Learn to apply the randomization to the blocks of various fields in agriculture.
4. To get the familiarity about applications of three principles.
5. Learn to deal the agricultural fields with different factors and levels.
6. To use appropriate experimental designs to analyse the experimental data.

II. Syllabus

Unit – 1: Analysis of variance (ANOVA)

Definition, assumptions and uses - One way, two way classifications - Assumptions, merits, demerits, parameter estimations - Analysis of variances.

Unit – 2: Design of experiments and CRD

Definition – Terminology- Basic principles of design of experiments – Completely Randomised Design(CRD) -definition, assumptions, advantages and disadvantages – Layout - Statistical analysis.

Unit – 3: Randomised Block Design (RBD)

Definition, assumptions, advantages and disadvantages – Layout - Statistical analysis. RBD with one missing value and its analysis - Efficiency of RBD relative to CRD.

Unit – 4: Latin Square Design (LSD)

Definition, assumptions, advantages and disadvantages – Layout - Statistical analysis. LSD with one missing value and its analysis - Efficiency of LSD relative to CRD – Efficiency of LSD relative to RBD

Unit – 5: Factorial experiments

Definition, merits, demerits – Types of factorial experiments – Main effects and interaction effects – Relationships – contrast – Orthogonal contrast – Yates procedure to find factorial effect totals – Statistical analysis of 2^2 and 2^3 factorial experiments in case of RBD.

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STATISTICS MINOR

COURSE 3: ANALYSIS AND DESIGN OF EXPERIMENTS

Practical

Credits: 1

2 hrs/week

III. Syllabus

1. One - way classification with equal number of repetitions.
2. One - way classification with un equal number of repetitions.
3. Two-way classification.
4. Analysis of CRD
5. Analysis of RBD
- 6 Missing observation in RBD
- 7 Analysis of LSD
8. Missing observation in LSD
9. Analysis of 2^2 with RBD layout.
10. Analysis of 2^3 with RBD layout.

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.

IV. References

1. S. C. Gupta & V. K. Kapoor: Fundamentals of Applied Statistics, Sultan Chand& Sons, New Delhi.
2. K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC. PHI.
3. M. R. Saluja: Indian Official Statistics. ISI publications.

V. Suggested Co-curricular Activities:

1. Training of students by related industrial experts
2. Assignments including technical assignments if any.
3. Seminars, Group Discussions, Quiz, Debates etc on related topics.
4. Preparation of audio and videos on tools of diagrammatic and graphical representations.
5. Collection of material/figures/photos/author photos of related topics.
6. Invited lectures and presentations of stalwarts to those topics.
7. Visits/field trips of firms, research organizations etc.

MODEL PAPER

SRI VENKATESWARA UNIVERSITY: TIRUPATI

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STATISTICS MINOR

COURSE 3 : ANALYSIS AND DESIGN OF EXPERIMENTS

Time: 3hrs

Max.Marks :

70Section - A

Answer any Five of the following questions.

5X4=20M

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

Section - B

Answer All Questions. Each Question carries 10 Marks. 5X10=50M

9. a)

Or

b)

10. a)

Or

b)

11. a)

Or

b)

12. a)

Or

b)

13. a)

Or

b)

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SEMESTER-IV - W.E.F. 2024-25

STATISTICS MINOR

COURSE 4 : NUMERICAL ANALYSIS

Theory

Credits: 3

3 hrs/week

I. Learning Outcomes :

After learning this course the student will be able

1. Learn the different difference operators and applications.
2. Accustom with the interpolation techniques with equal and unequal intervals.
3. Able to use numerical differentiation tools.
4. Familiar to use numerical integration methods.

II. Syllabus

Unit 1 : Finite differences

Definitions of the operators Δ , ∇ and E - Relationships and properties - Difference table - Estimating missing values - Fundamental theorem on finite differences and simple problems.

Unit 2 : Interpolation

Concepts of interpolation and extrapolation - Assumptions and uses of interpolation - Newton's forward and backward interpolation formulae - Interpolation with unequal intervals - Divided differences and their properties- Newton's Divided difference formula - Inverse interpolation - Lagrange's formula

Unit 3 :Central differences

Definition - Properties - Gauss forward and backward, Sterling's, Bessel's and Laplace - Everett's central difference Formulae.

Unit 4 :Numerical Differentiation

Introduction to Numerical differentiation. Determination of First and Second order derivatives for the given data using Newton's forward and backward, Gauss forward and backward, Sterling's, Bessel's and Newton's Divided differences formulae.

Unit 5 : Numerical Integration

Introduction to Numerical integration, General Quadrature formula for equidistant ordinates, Trapezoidal rule, Simpson's $1/3^{\text{rd}}$, Simpson's $3/8^{\text{th}}$ rule and Weddle's rule.

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**SEMESTER-IV - W.E.F. 2024-25
STATISTICS MINOR
COURSE 4: NUMERICAL ANALYSIS**

Practical

Credits: 1

2 hrs/week

III. Syllabus :

1. Newton-Gregory forward interpolation formula
2. Newton-Gregory backward interpolation formula
3. Newton's divided differences interpolation formula
4. Lagrange's formulae
5. Gauss forward differences formula.
6. Gauss backward differences formula.
7. Sterling's formula.
8. Bessel's formulae.
9. Laplace-Everett's formula.
10. Newton's forward differentiation.
11. Newton's backward differentiation.
12. Gauss forward and backward differentiation.
13. Trapezoidal rule.
14. Simpson's $1/3^{\text{rd}}$, Simpson's $3/8^{\text{th}}$ rules

IV. References

1. H. C. Saxena: Finite Differences and Numerical Analysis, S. Chand and Company, New Delhi.
2. P. P. Gupta, G. S. Malik & Sanjay Gupta: Calculus of Finite Differences and Numerical Analysis, Krishna Prakashan Media(P) Ltd., Meerut(UP), India.
3. S. S. Sastry: Introductory Methods Numerical Analysis, Prentice- Hall of India.
4. C. F. Gerald and P. O. Wheatley: Applied Numerical Analysis, Addison-Wesley, 1998.

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b)

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Or

b)