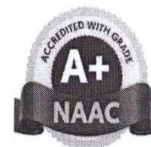


SHRI GNANAMBICA DEGREE COLLEGE: MADANAPALLE



(AUTONOMOUS)
STATISTICS-MAJOR
COURSE-6: INFERENCE AND APPLIED STATISTICS
SEMESTER III
(W.E.F.2024 - 25)



Program: B.Sc. Data Science

Hours per week: 4

Credits: 3

Course Learning Outcomes: After completion of this course, the students will know about

- Concept of law large numbers and their uses
- Knowledge about important inferential aspects such as point estimation, test of hypotheses and associated concepts
- Knowledge about inferences from Binomial, Poisson and Normal distributions as illustrations,
- Concept about non-parametric method and some important non-parametric tests.
- Time series data, its applications to various fields and components of time series,
- Various data collection methods enabling to have a better insight in policy making, planning and systematic implementation, Construction and implementation of life tables, Population growth curves, population estimates and projections,
- Real data implementation of various demographic concepts as outlined above through practical assignments.

UNIT I

Concepts: Population, Sample, Parameter, statistic, Sampling distribution, Standard error. Student's t-distribution, F – Distribution, χ^2 -Distribution: Definitions, properties and their applications.

UNIT II

Theory of estimation and Hypothesis: Estimation of a parameter, criteria of a good estimator – Unbiasedness, consistency, efficiency, sufficiency. Binomial, Poisson & Normal Population parameters estimate by MLE method. Confidence Intervals. Concepts of statistical hypotheses, null and alternative hypothesis, critical region, two types of errors, level of significance and power of a test.

UNIT III

Sample tests: t-test for single mean, difference of means and paired t-test. Confidence intervals for mean(s). standard deviation(s) and correlation coefficient(s). Test for goodness of fit and independence of attributes. F-test for equality of variances.

UNIT IV

Time Series: Time Series and its components with illustrations, additive, multiplicative models. Trends: Estimation of trend by method of semi averages. Determination of trend by least squares (Linear trend, parabolic trend only), moving averages method.

UNIT V

Vital Statistics: Introduction, definition and uses of vital statistics, sources of vital statistics. Measures of different Mortality and Fertility rates. Life tables: construction and uses of life tables.



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TEXT BOOKS:

- BA/BSc II year statistics - statistical methods and inference - Telugu Academy by
- A.Mohanrao,N.Srinivasa Rao, Dr R.Sudhakar Reddy, Dr T.C. RavichandraKumar.
- K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC.PHI.
- Fundamentals of applied statistics : VK Kapoor and SCGupta.
- BA/BSc III year paper - III Statistics - applied statistics - Telugu academy by prof.K.SrinivasaRao,Dr D.Giri. Dr A.Anand, Dr V.PapaiahSastry.

REFERENCE BOOKS:

1. Brockwell, P.J. and Devis, R.A. (2003). Introduction to Time Series Analysis. Springer.
2. Chatfield, C. (2001). Time Series Forecasting., Chapman & Hall.
3. Srinivasan, K. (1998). Demographic Techniques and Applications. Sage Publications
4. Srivastava O.S. (1983). A Text Book of Demography. Vikas Publishing House
5. Fundamentals of Mathematics statistics : VK Kapoor and SCGuptha.
6. Outlines of statistics, Vol II : Goon Guptha, M.K.Guptha, Das GupthaB.
7. Introduction to Mathematical Statistics : HoelP.G. 8. Hogg Tanis Rao: Probability and Statistical Inference. 7 th edition.Pearson.



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SHRI GNANAMBICA DEGREE COLLEGE: MADANAPALLE



(AUTONOMOUS)
STATISTICS-MAJOR
COURSE-6: INFERENCE AND APPLIED STATISTICS - PRACTICALS
SEMESTER III
(W.E.F.2024 - 25)



Program: B.Sc. Data Science

Hours per week: 2

Credits: 1

List of Experiments:

Sample Tests

1. Large sample test for difference of means.
2. Large sample test for single proportion
3. Large sample test for difference of proportions, standard deviations , correlation coefficient.
4. Small sample test for single mean, difference of means and correlation coefficient
5. Paired t-test(paired samples).
6. Small sample test for single variance(χ^2 - test)
7. F-Test for variances.

Time Series

8. Measurement of trend by method of moving averages(odd and even period)
9. Measurement of trend by method of Least squares(linear and parabola)
10. Determination of seasonal indices by method simple averages
11. Determination of seasonal indices by method of Ratio to moving averages

Vital Statistics

12. Computation of various Mortality rates
13. Computation of various Fertility rates
14. Computation of various Reproduction rates.
15. Construction of Life Tables



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(AUTONOMOUS)

STATISTICS-MAJOR

COURSE-6: INFERENCE AND APPLIED STATISTICS

SEMESTER III

(W.E.F.2024 - 25)

Program: B.Sc. Data Science

Question Paper Blue Print

Time : 3 Hrs

Max Marks: 70

Part-A

Answer any Four of the following

4x5=20Marks

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

Answer any Five of the following choosing one from each unit

5x10=50Marks

Unit-I

9. Question
- or
10. Question

Unit-II

11. Question
- or
12. Question

Unit-III

13. Question
- or
14. Question

Unit-IV

15. Question
- or
16. Question

Unit-V

17. Question
- or
18. Question



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(AUTONOMOUS)

STATISTICS-MAJOR

COURSE-6: INFERENCE AND APPLIED STATISTICS

SEMESTER III

(W.E.F.2024 - 25)

Program: B.Sc. Data Science

Model Question Paper

Time : 3 Hrs

Max Marks: 70

Part-A

Answer any **FOUR** of the following questions. Each question carries FIVE marks $4 \times 5 = 20$

1. Define population, Sample, Parameter, Standard error with examples
2. Show that in normal distribution the sample mean is an unbiased estimator of the population mean.
i.e., $E(\bar{x}) = \mu$.
3. Statement of factorization theorem. Find sufficient estimator for the parameter θ in exponential Distribution.
4. Explain method of maximum likelihood estimation and give its assumptions.
5. Explain small sample t-test for single mean.
6. Define Time series. Give its uses.
7. Explain Graphical Method.
8. Uses of Vital Statistics.

Part-B

Answer any **ONE** of the following questions. Each question carries TEN marks $5 \times 10 = 50$

UNIT-1

9. Define F- distribution. Write its properties and applications.

(Or)

10. Derive the relationship between χ^2 and F distribution.

UNIT-2

11. Explain the properties for a good estimator.

(Or)

12. Explain Statistical Hypothesis, Null Hypothesis, alternative Hypothesis, Critical region Type-1 and Type-2 errors.

UNIT-3

13. Explain Paired t-Test

(Or)

14. Explain F-test for equality of population variance.

UNIT-4

15. Explain components of Time series.

(Or)

16. Explain determination of trend by least squares method.

UNIT-5

17. Explain sources of Vital Statistics.

(Or)

18. Explain various columns of Life table.



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