SRI VENKATESWARA UNIVERSITY
B.A. DEGREE COURSE IN STATISTICS
SEMESTER SYSTEM WITH CBCS
SEMESTER IV
W.E.F. 2021-2022
(For Non - Mathematics Combination)
PAPER – IV : PROBABILITY DISTRIBUTIONS, CORRELATION AND REGRESSION

Course Outcomes:

After successful completion of this course, the student will be able to;

1. ability to distinguish between discrete and continuous distributions.
2. knowledge related to concept of curve fitting.
3. knowledge of important discrete and continuous distributions such as Binomial, Poisson, rectangular , normal, distributions.
4. acumen to apply standard discrete and continuous probability distributions to different situations.
5. knowledge related to concept of correlations.
6. knowledge related to concept of regressions.
7. Knowledge of correlation, regression analysis, regression diagnostics.

COURSE SYLLABUS

UNIT – I
DISCRETE DISTRIBUTIONS : Binomial and Poisson Distributions – Definitions, means, variances and applications of these distributions. Additive property if exists. Simple problems.

UNIT – II
CONTINUOUS DISTRIBUTIONS : Normal, Rectangular Distributions - definitions and their properties. Simple problems.

UNIT – III
CURVE FITTING : principle of least squares - fitting of straight line, Parabola.

UNIT – IV

CORRELATION: Meaning of Correlation, Types of correlation Karl-pear sons coefficient of correlation

(for individual series only) Spearman's Rank correlation.

UNIT – V

REGRESSION : Simple linear regression, properties of regression coefficients. Regression lines, Simple Problems.

Text Books :

    1. Fundamentals of Mathematical statistics - S.C. Gupta&V.K.Kapoor.

    2. Statistical methods - S.P Gupta.

Reference Books :

    1. Sambavyatha - TeluguAcademy.

    2. Fundamentals of statistics - Goon, Gupta and Das Gupta

Paper-4: Practicals:

1. Fitting of Binomial by Directmethod
2. Fitting of Poisson distribution.
3. Fitting of Rectangular distribution.
4. Fitting of Normal Distribution by Ordinates methods.
5. Fitting of StraightLine.
6. Fittingof Parabola.
7. Rank Correlation.
8. Correlation coefficient.
9. Regression lines X on Y.
10. Regression lines Y on X.

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(NON-MATHEMATICS COMBINATION)

SEMESTER-IV: PAPER-IV

PROBABILITY DISTRIBUTIONS, CORRELATION AND REGRESSIONS

(Statistical tables and Electronic Calculators are allowed)

TIME: 3 HOURS   **MAX.MARKS:75**

SECTION-A

ANSWER ANY FIVE QUESTIONS. EACH QUESTION CARRIES 5 MARKS 5X5=25

1. Define Binomial distribution. Write down its mean and variance.

2. Explain uses of Poisson distribution.

3. Importance of Normal distribution.

4. Define exponential distribution. Write down its mean and variance.

5. Explain the procedure of fitting of straight line by the method of least squares.

6. Explain the procedure of fitting of parabola by the method of least squares.

7. Explain correlation coefficient of $\sum x^2 = 222, \sum y^2 = 364, \sum xy = 261$

8. The ranks of two subjects A and B are given below. Obtain rank correlation coefficient.

$(3,2),(4,4),(1,1),(2,3),(6,6),(5,5)$

9. Define Regression. Write Regression coefficients.

10. Write properties of regression coefficients.

SECTTION-B

ANSWER ANY FIVE QUESTIONS.EACH QUESTION CARRIES 10 MARKS   5X10=50

11. (a) A fair coin is tossed six times. Find the probability of getting four heads.

    (OR)

   (b). A manufacturer knows that the condensers he makes contain on average 1% defectives. He packs them in boxes of 100. What is the probability that a box picked at random will contain 3 or more faulty condensers?

12. (a) Write properties of Normal distribution.

    (OR)

   (b) If X is uniformly distributed with mean 1 and variance $\dfrac{4}{3}$ find $P(X < 0)$.

13. (a) By the method of least squares find the straight line that best fits the following data.

x	1	2	3	4	5
y	12	25	40	50	65

    (OR)

(b). Fit a second degree parabola for the following data

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

14. (a) Calculate coefficient of correlation of the following data

x	10	12	13	16	17	20	25	30	34
y	20	22	26	27	29	33	37	40	42

    (OR)

   (b). Calculate rank correlation of the following data

x	72	70	46	69	56	65	65	45	35	75
y	111	110	105	112	115	115	101	118	107	120

15. (a) Calculate regression equation of Y on X from the following data

x	40	38	35	42	30
y	30	35	40	36	29

    (OR)

   (b) Write difference between correlation and regression.

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B.A. DEGREE COURSE IN STATISTICS

Course Outcomes:

After successful completion of this course, the student will be able to;

1) Concept of Criteria of a good estimator
2) Knowledge of large sampling.
3) Knowledge of small sampling.
4) Knowledge of Exact sampling
5) concept of random sample from a distribution, sampling distribution of a statistic, standard error of important estimates such as mean and proportions,
6) knowledge about important inferential aspects such as point estimation, test of hypotheses and associated concepts,
7) knowledge about inferences from Binomial, Poisson and Normal distributions as illustrations,
8) Concept about non-parametric method and some important non-parametric tests.

COURSE SYLLABUS:

UNIT-I

POPULATION – Sample – Parameter – Statistic – Sampling Distribution – Standard error – Hypothesis – Null Hypothesis – Alternative hypothesis – level of Significance – Type I error – Type II error – Examples-Degrees of freedom

UNIT-II

CRITICAL REGION – Best critical Region – power of the test – power curve – Neymann pearson Lemma statement only – uses - estimator – Estimate – point estimation – properties of good estimator – interval estimation – confidence interval – confidence limits.

UNIT-III

EXACT SAMPLING DISTRIBUTIONS – student – t distribution – F- Distribution -

χ^2 distribution – definitions – probability density functions – probability curves – properties – uses – conditions – differences and relationships between student – t, F and χ^2 distributions.

UNIT - IV

Large sample tests – procedure for testing null hypothesis – tests for single mean – Two Means – single proportion – Two proportion – Fisher Z- Transformation - test for single correlation efficient – Two correlation Co efficient - problems.

UNIT – V

Small or example sample tests – student – t Tests for single mean – teo means – paired student – t test - F test for two varcances - χ^2 tests for independence of attributes - Goodness of fit for binomial, Poisson distributions – problems.

Non – parametric tests – Assumptions – advantages – disadvantages – sign test – median test – run test.

Note : 1. Concentration on numerical problems Only.
     2. Proofs of theorems and Derivations of expressions are omitted.

Text Books:

1. Statistical methods - S.P. Gupta.
2. Fundamentals of statistics - Goon Gupta and Das Gupta vol I and vol II.

Reference Books:

1. AnuvarthitaSankyakaSastram - Telugu academy book.
2. Applied Statistics - V.K.Kapoor& S.CGupta.
3. Applied statistics - ParimalMukhopadhyay.

Paper-5: Practicals:

1. Large sample tests – SingleMean
2. Large sample tests – DoubleMean
3. Large sample tests –Single Proportion
4. Large sample tests –DoubleProportion
5. Small sample tests – t for Mean(s)
6. F-test
7. χ^2 test for Independence ofattributes.
8. Run test
9. Sign test
10. Median test.

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SEMESTER IV
W.E.F. 2021-2022
STATISTICS MODEL PAPER

(NON-MATHEMATICS COMBINATION)

SEMESTER IV : PAPER-V

STATISTICAL APPLICATIONS

(Statistical tables and Electronic Calculators are allowed)

TIME: 3 HOURS   **MAX.MARKS:75**

SECTION-A

ANSWER ANY FIVE QUESTIONS. EACH QUESTION CARRIES 5 MARKS 5X5=25

1. Define sample and population.

2. Explain the meaning of interval estimation.

3. Define critical region with examples?

4. A merchant is making engine parts with axle diameters of 0.7 inch. A random sample of 10 parts shows a mean diameter of 0.742 inch with a S.D of 0.4 inch. Compute the statistic you would use to test whether the work is meeting the specification.

5. A sample of 26 bulbs gives a mean life of 990 hours with a S.D of 20 hours. The manufacturer claims that the mean life of bulbs is 1000 hours. Is the sample not up to the standard.

6. Explain Differences between Large and small sample tests ?

7. Explain paired student - t – test

8. Explain two sample sign test ?

SECTION-B

ANSWER ANY FIVE QUESTIONS.EACH QUESTION CARRIES 10 MARKS   5X10=50

UNIT-I

9. (a) Explain standard error and mention its properties?

(OR)

(b). Describe type I & type II errors on detail with examples?

UNIT-II

10. (a) Define best critical region ? also give the statement of Neynann pearson Lemma with uses?

(OR)

(b). Describe various properties of good estimator?

UNIT-III

11. (a) Define student t – test statistic and its density function? Also give the

properties of student t – distribution.

(OR)

(b). Define χ^2 - test statistic and its distribution ? explain the properties and

conditions of two distributions.

UNIT-IV

12. (a) Describe large sample test for testing significant difference between two sample means?

(OR)

(b). Explain fisher Z – transformation also describe large sample test for testing the significance of population correlation efficient when $l > 0.5$?

UNIT-V

13. (a) Describe F-test for testing equality between two sample variances?

(OR)

(b). Explain parametric and non parametric tests ? also describe the assumptions, Merits and demerits of non parametric tests over parametric tests?