KAKARAPARTI BHAVANARAYANA COLLEGE (Autonomous)
Department of Mathematics & Statistics

Class:	Semester:	Title of The Paper:	Course Code:	W.E.F
I B.Sc. (IOT)	III	**Descriptive Statistics**	R20IOTSTAT301	2021-22

Total No of Hours for Teaching - Learning	Instructional Hours for Week		Duration of Semester End Examination in Hours	Max Marks		Credits
	Theory	Practical		CIA	SEE	
60 Hours	3	2	3 Hours	25	75	4

Objectives

- The objective of this paper is to throw light on the role of statistics in different fields with special reference to business and economics.
- It gives the students to review good practice in presentation and the format most applicable to their own data.
- The measures of central tendency or averages reduce the data to a single value which is highly useful for making comparative studies.
- The measures of dispersion throw light on reliability of average and control of variability
- The concept of Correlation and Linear Regression deals with studying the linear relationship between two or more variables, which is needed to analyse the real life problems.
- The attributes gives an idea that how to deal with qualitative data.

Course Learning Outcomes

Students will acquire

1) knowledge of Statistics and its scope and importance in various areas such as Medical, Engineering, Agricultural and Social Sciences etc.
2) knowledge of various types of data, their organization and evaluation of summary measures such as measures of central tendency and dispersion etc.
3) knowledge of other types of data reflecting quality characteristics including concepts of independence and association between two attributes,
4) insights into preliminary exploration of different types of data.
5) Knowledge of correlation, regression analysis, regression diagnostics, partial and multiple correlations.

Syllabus

UNIT - I

Measures of Central Tendency: Mean, Median, Mode, Geometric Mean and Harmonic Mean.
Measures of Dispersion: Range, Quartile Deviation, Mean Deviation and Standard Deviation, Variance.

UNIT-II

Central and Non-Central moments and their interrelationship. Sheppard's correction for moments. Skewness and kurtosis. Definitions of M.G.F, C.G.F, P.G.F, C.F and their properties.

UNIT-III

Correlation: Meaning, Types of Correlation, Measures of Correlation: Scatter diagram, Karl Pearson's Coefficient of Correlation, Rank Correlation Coefficient (with and without ties), Bi-variate frequency distribution, correlation coefficient for bi-variate data and simple problems.

UNIT-IV

Regression: Concept of Regression, Linear Regression: Regression lines, Regression coefficients and it's properties, Regressions lines for bi-variate data and simple problems. Correlation vs regression.

UNIT-V

Discrete Distributions: Binomial, Poisson distributions: Definitions, means, variances, M.G.F, C.F, C.G.F, P.G.F, additive property if exists. Possion approximation to Binomial distribution.

Continuous Distributions: **Normal Distribution**: Definition, Importance, Properties, M.G.F, CF, additive property.

Text Books:

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
2. BA/BSc I year statistics - descriptive statistics, probability distribution - Telugu Academy
3. K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC. PHI

Reference books:

1. Willam Feller: Introduction to Probability theory and its applications. Volume – I, Wiley
2. Goon AM, Gupta MK, Das Gupta B : Fundamentals of Statistics , Vol-I, the World Press Pvt.Ltd., Kolkata.
3. Hoel P.G: Introduction to mathematical statistics, Asia Publishing house.
4. M. JaganMohan Rao and Papa Rao: A Text book of Statistics Paper-I.
5. Sanjay Arora and Bansi Lal: New Mathematical Statistics: Satya Prakashan , New Delhi
6. Hogg Tanis Rao: Probability and Statistical Inference. 7^{th} edition. Pearson.

Practical's

1. Computation of measures of central tendency(Mean, Median and Mode)
2. Computation of measures of dispersion(Q.D, M.D and S.D)
3. Computation of Karl Pearson's coefficients of Skewness and Bowley's coefficients of Skewness.

4. Fitting of straight line by the method of least squares
5. Fitting of parabola by the method of least squares
6. Fitting of power curve of the type by the method of least squares.
7. Fitting of exponential curve of the type and by the method of least squares.
8. Computation of correlation coefficient and regression lines for ungrouped data
9. Computation of correlation coefficient, forming regression lines for grouped data
10. Fitting of Binomial distribution – Direct method.
11. Fitting of binomial distribution – Recurrence relation Method.
12. Fitting of Poisson distribution – Direct method.
13. Fitting of Poisson distribution - Recurrence relation Method

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Department of Mathematics & Statistics

Class:	Semester:	Title of The Paper:	Paper	Paper Code:	W.E.F
II B.Sc.(I.O.T)	IV	Statistical Inference	IV	R20IOTSTAT401	2021-22

Total No of Hours for Teaching - Learning	Instructional Hours for Week		Duration of Semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory	Practical	3 Hours	CIA	SEE	4
	3	2		25	75	

Objectives:

- This paper deals with standard sampling distributions like Chi Square, t and F and their characteristics and applications.
- This paper deals with the different techniques of point estimation for estimating the parameter values of population and interval estimation for population parameters.
- In this paper, various topics of Inferential Statistics such as interval estimation, Testing of Hypothesis, large sample tests (Z-test), small sample tests (t-test, F-test, chi-square test) and non-parametric tests are dealt with. These techniques play an important role in many fields like pharmaceutical, agricultural, medical etc.

Course Learning Outcomes

The students will acquire

1. Concept of law large numbers and their uses
2. Concept of central limit theorem and its uses in statistics
3. concept of random sample from a distribution, sampling distribution of a statistic, standard error of important estimates such as mean and proportions,
4. knowledge about important inferential aspects such as point estimation, test of hypotheses and associated concepts,
5. knowledge about inferences from Binomial, Poisson and Normal distributions as illustrations, concept about non-parametric method and some important non-parametric tests.

UNIT-I

Simple Random Sampling (with and without replacement): Notations and terminology, various probabilities of selection. Methods of selecting simple random sample, lottery method, method based on random numbers. Estimates of population total, mean and their variances

Stratified random sampling: Stratified random sampling, Advantages and Disadvantages of Stratified Random sampling, Estimation of population mean, and its variance. Stratified random sampling with proportional and optimum allocations. Comparison between proportional and optimum allocations with SRSWOR.

Systematic sampling: Systematic sampling definition when N = nk and merits and demerits of systematic sampling - estimate of mean and its variance.

UNIT II

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

Theory of estimation: Estimation of a parameter, criteria of a good estimator – unbiasedness, consistency, efficiency, &sufficiency

UNIT-III

Testing of Hypothesis: Concepts of statistical hypotheses, null and alternative hypothesis, critical region, two types of errors, level of significance and power of a test. One and two tailed tests. Neyman- Pearson's lemma. Examples in case of Binomial, Poisson, Exponential and Normal distributions.

UNIT – IV

Large sample Tests: large sample test for single mean and difference of two means, confidence intervals for mean(s). Large sample test for single proportion, difference of proportions. standard deviation(s) and correlation coefficient(s**).**

UNIT – V

Small Sample tests: t-test for single mean, difference of means and paired t-test. χ^2 - test forgoodness of fit and independence of attributes. F-test for equality of variances.

TEXT BOOKS

1. 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.
2. K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC. PHI.

REFERENCE BOOKS:

1. Fundamentals of Mathematics statistics : VK Kapoor and SC Guptha.
2. Outlines of statistics, Vol II : Goon Guptha, M.K.Guptha, Das Guptha B.
3. Introduction to Mathematical Statistics : Hoel P.G.
4. Hogg Tanis Rao: Probability and Statistical Inference. 7th edition. Pearson.

PRACTICALS

1. Large sample test for single mean
2. Large sample test for difference of means
3. Large sample test for single proportion
4. Large sample test for difference of proportions
5. Large sample test for difference of standard deviations
6. Large sample test for correlation coefficient
7. Small sample test for single mean

8. Small sample test for difference of means
9. Small sample test for correlation coefficient
10. Paired t-test(paired samples).
11. Small sample test for single variance(χ 2 - test)
12. Small sample test for difference of variances(F-test)
13. χ 2 - test for goodness of fit and independence of attributes

Note: Training shall be on establishing formulae in Excel cells and deriving the results. The excel output shall be exported to MS Word for writing inferences.