

Nellore,
06-09-2020

From
Dr K.Sreenivasulu
Chairman, BOS (STATISTICS)(UG)
Lecturer in Statistics
Sri Sarvodaya College
Nellore

To
The Registrar,
Vikrama Simhapuri University
Nellore.

Sir,

Sub: Submission of Minutes of online meeting of BOS(Statistics)-Reg
Ref: Proc.Rc No.VSU/Academic/BOS/Meeting/2020 dated 19.08.2020
of the Vice Chancellor, V.S.University

Sir,

With reference to your letter cited above, I have conducted online BOS meeting for the approval of the syllabus for the course of "STATISTICS(WM), STATISTICS(NM)" as CORE courses w.e.f. 2020-21 on 06.09.2020 at 4PM. Members of the board have attended online and discussed about the given agenda wise. I am herewith enclosed the copy of minutes of the meeting, finalized syllabus along with model question papers.

This is for your kind information and necessary action.

Thanking you sir,

Yours faithfully,



Encl: Approved Syllabus of Statistics(WM)
and Statistics (NM) along with Minutes copy and Model papers

(K.SREENIVASULU)



**VIKRAMA SIMHAPURI UNIVERSITY: NELLORE
BOARD OF STUDIES (UG) OF STATISTICS**

**MINUTES OF THE BOARD OF STUDIES OF STATISTICS ONLINE MEETING HELD ON
06-09-2020 AT 4PM THROUGH GOOGLE MEET**

AGENDA ITEM-1: APPROVAL OF I & II YEARS (I TO IV SEMESTERS) SYLLABUS

- A) **STATISTICS(WM):** Approved 1st and 2nd year Syllabus with some modifications
- B) **STATISTICS(NM):** Prepared and approved 1st and 2nd year Syllabus

AGENDA ITEM-2: MODIFICATIONS OF THE SYLLABUS IF ANY (10%)

A) STATISTICS(WM):

PAPER-1: DESCRIPTIVE STATISTICS:

Unit-1:

Deleted: Diagrammatic and Graphical representation of data: Histogram, Frequency Polygon, Ogives, Pie

Deleted: Median and Mode through graph

Unit-2: No Changes

Unit-3:

Deleted: Bi-variate frequency distribution, correlation coefficient for bivariate data and simple problems

Deleted: (Three variables only) and Properties

Unit-4: No changes

Unit-5: No Changes

Practical -1:

Minimum 10 Practicals should be done

PAPER-2: PROBABILITY THEORY AND DISTRIBUTIONS

Unit-1:

Deleted: and its applications in real life problems

Unit-2: No Changes

Unit-3:

Substitute “moments, coefficient of skewness and kurtosis” **with** “Mean and Variance”

Unit-4:

Deleted: C.G.F, P.G.F

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Deleted: “and variance” in Hyper Geometric distribution.

Unit-5:

Deleted: “C.G.F “ in second line

Practical -2: No Changes

PAPER-3: STATISTICAL INFERENCE:

Unit-1:

Deleted: Convergence in Probability and Convergence in Distribution, Law of Large Numbers

Added: “ No need of derivations” in fourth line

Unit-2: No Changes

Unit-3:

Deleted: “Exponential and” in third line

Unit-4: No changes

Unit-5:

Substitute “One sample runs test, Sign test and Wilcoxon-signed rank tests(single and Paired samples).Two independent sampe tests: Median test, Wilcoxon Mann-whitey U test,Wald Wolfowitz’s runs test” **with**

“Sign, Run and Median Tests for two Large samples only”

Practical -3:

Minimum 10 Practicals should be done

Replace 14, 15, 16 practicals with the following:

14.Two sample Sign test

15. Two sample Run test

16.Median test for two independent samples

PAPER-4:SAMPLING TECHNIQUES AND DESIGN OF EXPERIMENTS

Unit-1:

Deleted: Determination of Sample size, Simple random sampling of attributes

Unit-2: No Changes

Unit-3: No Changes

Unit-4: No changes

Added : Advantages, disadvantages

Deleted: Efficiency RBD over CRD, Efficiency of LSD over RBD and CRD.

Unit-5: No Changes

Practical -4:

Minimum 10 Practicals should be done

PAPER-5: APPLIED STATISTICS:

Unit-1:No Changes

Unit-2:

Deleted: Deseasonalization

Unit-3:

Deleted: Detrending, effect of elimination of trend on other components of the time series.

Added : Uses of Growth Curves

Unit-4:

Added: Dorbish - Bowley Index number

Unit-5:

Added: “ Derivations not required” in third line

Practical -5:

Minimum 10 Practicals should be done

B) STATISTICS(NM) :

Prepared and Approved Statistics(NM) syllabus for both theory and practicals

AGENDA ITEM-3: MODEL QUESTION PAPERS

A) STATISTICS(WM): Prepared and approved

B) STATISTICS(NM) : Prepared and approved

AGENDA ITEM-4: SCHEME OF EXAMINATIONS

A) STATISTICS(WM): Prepared and approved

B) STATISTICS(NM) : Prepared and approved

AGENDA ITEM-5: LIST OF PANEL OF EXAMINERS

A) STATISTICS(WM): It remains as Previous

B) STATISTICS(NM) : It remains as Previous

AGENDA ITEM-6: INDUSTRY AND ACADEMIC INTERACTION

- A) STATISTICS(WM):** Resolved to conduct more interaction programmes with nearby industries and get MOUs for the benefit of the students to get employability skills
- B) STATISTICS(NM) :** Resolved to conduct more interaction programmes with nearby industries and get MOUs for the benefit of the students to get employability skills

AGENDA ITEM-7: MEASURES TO BE TAKEN TO ENHANCE SOCIETY AND ACADEMIA INTERACTION

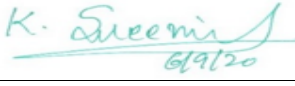

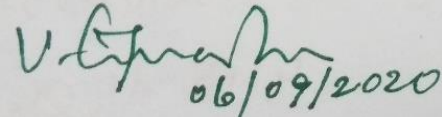
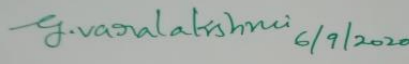
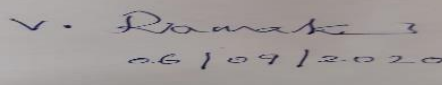
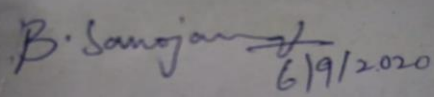
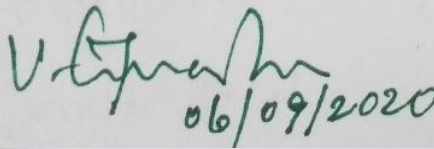
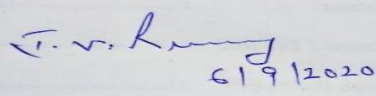
- A) STATISTICS(WM):** Resolved to conduct more awareness programmes on social and health issues using NSS/NCC/RRC etc platforms.
- B) STATISTICS(NM) :** Resolved to conduct more awareness programmes on social and health issues using NSS/NCC/RRC etc platforms.

All the above agenda items are accepted by the members of Board of Studies(UG) in Statistics Unanimously.

K. Sreeniva
6/9/20

VIKRAMASIMHAPURI UNIVERSITY: NELLORE

MEMBERS ATTENDED TO THE THE BOARD OF STUDIES OF STATISTICS(UG) ONLINE MEETING HELD ON 06-09-2020 AT 4PM THROUGH GOOGLE MEET

Sl.No	Name of the Member	Capacity	Signature
1	Dr K.Sreenivasulu Lecturer in Statistics Sri Sarvodaya College Nellore	Chairman	
2	Prof. K.Rosaiah Professor of Statistics Acharya Nagarjuna University Guntur	External	----
3	Dr P.Maheswari Lecturer in Statistics Govt.Degree College for Men, Srikalahasti	External	
4	Dr V.Munaiah Lecturer in Statistics PVKN Govt.Degree College Chittoor	External	
5	Dr G.Varalakshmi Lecturer in Statistics DK Govt College for Women Nellore	Internal (Autonomous)	
6	Dr V.Ramakrishna Lecturer in Statistics SVSSC Govt. Degree College for Women, Sullurupet	Internal	
7	Dr K.V.S.Vara Prasad Lecturer in Statistics SVGS College Nellore	Internal	----
8	Dr B.Sarojamma Dept of Statistics S.V.University Tirupati	External	
9	Dr M.V.BhaskarReddy Lecturer in Statistics Dr SRJ Degree College Atmakur	Special Invitee (from Unaided)	
10	Sri J.Venkateswara Reddy Lecturer in Statistics Krishna Chatanya Degree College, Nellore	Special Invitee (from Unaided)	



VIKRAMA SIMHAPURI UNIVERSITY
NELLORE

B.A/B.Sc -STATISTICS (*WITH MATHEMATICS*)



UG (CBCS) SEMESTER PATTERN
REVISED SYLLABUS
(W.E.F 2020-21 ADMITTED BATCH)
I TO IV SEMESTER

VIKRAMA SIMHAPURI UNIVERSITY: NELLORE

B.A/B.Sc., STATISTICS (WITH MATHEMATICS)

REVISED SYLLABUS

CBCS/SEMESTER SYSTEM (W.E.F 2020-21 ADMITTED BATCH)

COURSE STRUCTURE (SEMESTER -I TO SEMESTER-IV)

Semester	Paper	Subject	Hrs	Credits	Marks		
					IA	SEE	Total
I	I	DESCRIPTIVE STATISTICS	4	4	25	75	100
		PRACTICAL-1	2	1	0	50	50
II	II	PROBABILITY THEORY AND DISTRIBUTIONS	4	4	25	75	100
		PRACTICAL-2	2	1	0	50	50
III	III	STATISTICAL INFERENCE	4	4	25	75	100
		PRACTICAL-3	2	1	0	50	50
IV	IV	SAMPLING TECHNIQUES AND DESIGN OF EXPERIMENTS	4	4	25	75	100
		PRACTICAL-4	2	1	0	50	50
	V	APPLIED STATISTICS	4	4	25	75	100
		PRACTICAL-5	2	1	0	50	50

OBJECTIVE OF THE COURSE

Statistics is a key to success in the field of science and technology. Today, the students need a thorough knowledge of fundamental basic principles, methods, results and a clear perception of the power of statistical ideas and tools to use them effectively in modeling, interpreting and solving the real life problems. Statistics plays an important role in the context of globalization of Indian economy, modern technology, computer science and information technology.

The main objectives of the course are

- To build the basis for promoting theoretical and application aspects of statistics.
- To underline the statistics as a science of decision making in the real life problems with the description of uncertainty.
- To emphasize the relevance of statistical tools and techniques of analysis in the study of interdisciplinary sciences.
- To acquaint students with various statistical methods and their applications in different fields.
- To cultivate statistical thinking among students.
- To develop skills in handling complex problems in data analysis and research design.
- To prepare students for future courses having quantitative components.

This course is aimed at preparing the students to hope with the latest developments and compete with students from other universities and put them on the right track.

PAPER WISE OBJECTIVES

PAPER-I: Descriptive Statistics

- 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 analyze the real life problems.
- The attributes gives an idea that how to deal with qualitative data.

PAPER-II: Probability Theory and Distributions

- This paper deals with the situation where there is uncertainty and how to measure that uncertainty by defining the probability, random variable and mathematical expectation which are essential in all research areas.
- This paper gives an idea of using various standard theoretical distributions, their chief characteristics and applications in analyzing any data.

PAPER-III: Statistical Inference

- 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.

PAPER-IV: Sampling Techniques and Design of Experiments

- The sampling techniques deals with the ways and methods that should be used to draw samples to obtain the optimum results, i.e., the maximum information about the characteristics of the population with the available sources at our disposal in terms of time, money and manpower to obtain the best possible estimates of the population parameters
- This paper throw light on understanding the variability between group and within group through Analysis of Variance
- This gives an idea of logical construction of Experimental Design and applications of these designs now days in various research areas.
- Factorial designs allow researchers to look at how multiple factors affect a dependent variable, both independently and together.

PAPER-V: Applied Statistics

- This paper deals the time series on simple description methods of data, explains the variation, forecasting the future values, control procedures.
- It gives an idea of using index numbers in a range of practical situations, limitations and uses
- The vital statistics enlighten the students in obtaining different mortality, fertility rates thus obtaining the population growth rates and construction and use of life tables in actuarial science.

VIKRAMA SIMHAPURI UNIVERSITY: NELLORE
B.A/B.Sc., STATISTICS (WITH MATHEMATICS)
REVISED SYLLABUS
CBCS/SEMESTER SYSTEM (W.E.F 2020-21 ADMITTED BATCH)
SEMESTER – I
PAPER - I: DESCRIPTIVE STATISTICS

UNIT-I

Introduction to Statistics: Importance of Statistics. Scope of Statistics in different fields. Concepts of primary and secondary data. Measures of Central Tendency: Mean, Median, Mode, Geometric Mean and Harmonic Mean

UNIT-II

Measures of Dispersion: Range, Quartile Deviation, Mean Deviation and Standard Deviation, Variance. Central and Non-Central moments and their interrelationship. Sheppard's correction for moments. Skewness and kurtosis.

UNIT-III

Curve fitting: Bi- variate data, Principle of least squares, fitting of n^{th} degree polynomial. Fitting of straight line, Fitting of Second degree polynomial or parabola, Fitting of power curve and exponential curves.

Correlation: Meaning, Types of Correlation, Measures of Correlation: Scatter diagram, Karl Pearson's Coefficient of Correlation, Rank Correlation Coefficient (with and without ties). Concept of multiple and partial correlation coefficients

UNIT-IV

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

UNIT-V

Attributes : Notations, Class, Order of class frequencies, Ultimate class frequencies, Consistency of data, Conditions for consistency of data for 2 and 3 attributes only , Independence of attributes , Association of attributes and its measures, Relationship between association and colligation of attributes, Contingency table: Square contingency, Mean square contingency, Coefficient of mean square contingency, Tschuprow's coefficient of contingency.

Text Books:

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sulthand & Sons, New Delhi.
- 2 BA/BSc I year statistics - descriptive statistics, probability distribution – Telugu Academy- Dr M.Jaganmohan Rao, Dr N.Srinivasa Rao, Dr P.Tirupathi Rao, Smt.D.Vijayalakshmi.
- 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., Kolakota.
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

Practicals - Paper – I Note:**Minimum of 10 practicals should be done**

1. Graphical presentation of data (Histogram, frequency polygon, Ogives).
2. Diagrammatic presentation of data (Bar and Pie).
3. Computation of measures of central tendency(Mean, Median and Mode)
4. Computation of measures of dispersion(Q.D, M.D and S.D)
5. Computation of non-central, central moments, μ_1 and μ_2 for ungrouped data.
6. Computation of non-central, central moments, μ_1 and μ_2 and Sheppard's corrections for grouped data.
7. Computation of Karl Pearson's coefficients of Skewness and Bowley's coefficients of Skewness.
8. Fitting of straight line by the method of least squares
9. Fitting of parabola by the method of least squares
10. Fitting of power curve of the type by the method of least squares.
11. Fitting of exponential curve of the type and by the method of least squares.
12. Computation of correlation coefficient and regression lines
13. Computation of Rank correlation coefficient
14. Computation of Yule's coefficients of association
15. Computation of Coefficients of Contingency

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.

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.

VIKRAMASIMHAPURI UNIVERSITY
THREE YEAR B.A./B.Sc DEGREE EXAMINATION
STATISTICS(WM)
(W.E.F 2020-21 ADMITTED BATCH)
SEMESTER – I
PAPER 1: DESCRIPTIVE STATISTICS

Time: 3 Hours

Max. Marks : 75

SECTION – A

Answer any FIVE Questions :-

5 X 5 = 25M

1. Define Primary and Secondary data
2. Define mean and explain merits and demerits
3. Explain sheppard corrections for moments
4. Define Skewness? Mention various measures of Skewness?
5. Explain the Method of Fitting of Power Curve
6. Define Multiple & Partial Correlation Coefficients
7. Define Regression Coefficients? Mention the Properties.
8. What are the differences between Correlation & Regression?
9. What are the Conditions of Consistency of Two Attributes data.
10. Explain Independence of Attributes .

SECTION – B

Answer any FIVE questions :-

5 X 10 = 50M

11. Explain various measures of Central tendency.
12. Find Mean, Median for the following data

C.I	0- 20	20- 40	40- 60	60- 80	80- 100
f	15	23	50	25	10

13. Explain various measures of dispersion. State their merits and demerits.
14. Define central, non-central moments. Derive central moments in terms of raw moments.
15. Explain Fitting of a Second degree Parabola by Least Squares Method: Fit Parabola for the following data.

X	1960	1970	1980	1990	2000
Y	20	35	55	80	115

16. Define Karl Pearson Correlation Coefficient. State and prove the Properties of Correlation Coefficient
17. Derive regression line of Y on X .
18. The equations of the two regression lines are $8x-10y+66=0$, $40x-18y+214=0$ and $v(x)=9$, then find (a) Correlation Coefficient (b)S.D of y
19. Explain Yules Coefficient of Association and Colligation and Show that $Q=2Y/(1+Y^2)$
20. Explain Various Coefficients of Contingency.

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B.A/B.Sc., STATISTICS (WITH MATHEMATICS)
REVISED SYLLABUS
CBCS/SEMESTER SYSTEM (W.E.F 2020-21 ADMITTED BATCH)
SEMESTER – II
PAPER - II: PROBABILITY THEORY AND DISTRIBUTIONS

UNIT-I

Introduction to Probability: Basic Concepts of Probability, random experiments, trial, outcome, sample space, event, mutually exclusive and exhaustive events, equally likely and favourable outcomes. Mathematical, Statistical, axiomatic definitions of probability. Conditional Probability and independence of events, Addition and multiplication theorems of probability for 2 and for n events. Boole's inequality and Baye's theorem

UNIT-II

Random variable: Definition of random variable, discrete and continuous random variables, functions of random variable. Probability mass function. Probability density function, Distribution function and its properties. For a given pmf, pdf calculation of Mean and Variance. Bivariate random variable - meaning, joint, marginal and conditional Distributions, independence of random variables

UNIT- III

Mathematical expectation : Mathematical expectation of a random variable and function of a random variable. Moments and covariance using mathematical expectation with examples. Addition and Multiplication theorems on expectation. Definitions of M.G.F, C.G.F, P.G.F, C.F and their properties (Derivations not required).

Chebyshev and Cauchy – Schwartz inequalities.

UNIT-IV

Discrete Distributions: Binomial, Poisson, Negative Binomial, Geometric distributions: Definitions, means, variances, M.G.F, C.F, additive property if exists. Poisson approximation to Binomial distribution. Hyper-geometric distribution: Definition, mean.

UNIT - V

Continuous Distributions: Rectangular, Exponential, Gamma, Beta Distributions: mean, variance, M.G.F, C.F. **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- Dr M.Jaganmohan Rao, Dr N.Srinivasa Rao, Dr P.Tirupathi Rao, Smt.D.Vijayalakshmi.
3. K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC. PHI

Reference books:

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 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 Bansil Lal: New Mathematical Statistics: Satya Prakashan , New Delhi 6.
- Hogg Tanis Rao: Probability and Statistical Inference. 7th edition. Pearson.

Practicals Paper – II

1. Fitting of Binomial distribution – Direct method.
2. Fitting of binomial distribution – Recurrence relation Method.
3. Fitting of Poisson distribution – Direct method.
4. Fitting of Poisson distribution - Recurrence relation Method.
5. Fitting of Negative Binomial distribution.
6. Fitting of Geometric distribution.
7. Fitting of Normal distribution – Areas method.
8. Fitting of Normal distribution – Ordinates method.
9. Fitting of Exponential distribution.

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.

Course Learning Outcomes

Students will acquire

- 1) ability to distinguish between random and non-random experiments,
- 2) knowledge to conceptualize the probabilities of events including frequentist and axiomatic approach. Simultaneously, they will learn the notion of conditional probability including the concept of Bayes' Theorem,
- 3) knowledge related to concept of discrete and continuous random variables and their probability distributions including expectation and moments,
- 4) knowledge of important discrete and continuous distributions such as Binomial, Poisson, Geometric, Negative Binomial and Hyper-geometric, normal, uniform, exponential, beta and gamma distributions,
- (e) acumen to apply standard discrete and continuous probability distributions to different situations.

VIKRAMASIMHAPURI UNIVERSITY
THREE YEAR B.A./B.Sc DEGREE EXAMINATION
STATISTICS(WM)
(W.E.F 2020-21 ADMITTED BATCH)
SEMESTER – II
PAPER 2: PROBABILITY THEORY AND DISTRIBUTIONS

Time: 3 Hours

Max. Marks : 75

SECTION – A

Answer any FIVE Questions :-

5 X 5 = 25 M

1. Define (a) Random experiment (b) Sample Space.(c) Events
2. State and Prove Boole's Inequality
3. Define (a) pdf (b) pmf
4. If the pdf of x is $f(x) = x$, $0 < x < 2$ then find $E(x)$, $V(x)$
5. Define Mathematical Expectation. Mention the Properties.
6. Define mgf, cgf, cf of a Random variable.
7. Define poisson distribution. Find its mean.
8. Define Geometric distribution. Mention the properties.
9. Define Rectangular distribution. Find its mean.
10. Derive additive property of Normal distribution

SECTION – B

Answer any FIVE Questions.

5 X 10 = 50 M

11. Explain various definitions of Probability
12. State and prove Multiplication theorem of Probability for n events
13. Explain Distribution Function and its properties.
14. Define the Concepts (a) Joint pdf (b) Marginal pdf (c) Conditional pdf (d) Independence of Random variables
15. State and Prove Chebychev's Inequality.
16. State and Prove Multiplication theorem on Mathematical Expectation.
17. Define Binomial distribution and derive its mean and variance.
18. Derive Poisson distribution as a limiting case of Binomial distribution.
19. Define Normal distribution. Mention the Properties and Importance of Normal distribution.
20. Define Gamma distribution, find MGF of Gamma distribution.

VIKRAMA SIMHAPURI UNIVERSITY: NELLORE
B.A/B.Sc., STATISTICS (WITH MATHEMATICS)
REVISED SYLLABUS
CBCS/SEMESTER SYSTEM (W.E.F 2020-21 ADMITTED BATCH)
SEMESTER – III
PAPER-3: STATISTICAL INFERENCE

UNIT-I

Concepts: Population, Sample, Parameter, statistic, Sampling distribution, Standard error. Central limit theorem (statement only). Student's t- distribution, F – Distribution, χ^2 - Distribution: Definitions, properties and their applications (No need of derivations)

UNIT-II

Theory of estimation: Estimation of a parameter, criteria of a good estimator – unbiasedness, consistency, efficiency, & sufficiency and Statement of Neyman's factorization theorem. Estimation of parameters by the method of moments and maximum likelihood (M.L), properties of MLE's. Binomial, Poisson & Normal Population parameters estimate by MLE method. Confidence Intervals.

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, 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).

Small Sample tests: t-test for single Mean, difference of Means and Paired t-test. χ^2 -test for Goodness of fit and Independence of attributes. F-test for Equality of variances.

UNIT – V

Non-parametric tests- Definition, advantages and disadvantages, comparison with Parametric tests. Measurement scale- nominal, ordinal, interval and ratio. Sign, Run, Median tests for two Large Samples only.

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. Ravichandra Kumar.
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 - Paper –III

Note: Minimum of 10 practicals should be done

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
14. Sign test for two samples
15. Run test for two samples
16. Median test for two independent samples

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.

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,
- 6) concept about non-parametric method and some important non-parametric tests.

VIKRAMASIMHAPURI UNIVERSITY
THREE YEAR B.A./B.Sc DEGREE EXAMINATION
STATISTICS(WM)
(W.E.F 2020-21 ADMITTED BATCH)
SEMESTER – III
PAPER 3: STATISTICAL INFERENCE

Time: 3 Hours

Max. Marks : 75

SECTION – A

Answer any FIVE Questions :-

5 X 5 = 25 M

1. Define the concepts (a)Population (b)Sample (c)Parameter (d)Statistic.
2. Define (a)Convergence in Probability (b) Convergence in Distribution
3. State Neyman-factorization theorem
4. Discuss the method of Moments in estimating the parameters
5. Explain Type-I and Type-II errors..
6. Explain one tail and two tail tests
7. Explain Large sample test for sample mean.
8. Explain F test for equality of variances
9. Define Nominal and Ordinal Scales of Measurement with examples.
10. Explain two sample Sign test

SECTION – B

Answer any FIVE questions :-

5 X 10 = 50M

11. Define Student's t-distribution, Mention the properties
12. Define F-distribution , Mention the properties and applications
13. Discuss the properties of a Good estimator.
14. Explain MLE method of estimation and mention the properties.
15. State and Prove Neyman Pearson Lemma
16. Explain the concepts (a) Null hypothesis (b)Alternative hypothesis (c)Critical region (d)Level of significance (e)power of the test
17. Explain Large sample test for single proportion.
Given that on average 3% of insured people die within a year, and 75 of 1000 such persons died within a particular year. Can this group be regarded as a representative of the sample?
18. Explain (a)Paired t-test (b) Chi-square test for goodness of fit.
19. Explain Non-parametric tests, their advantages and disadvantages.
20. Explain Median test for two independent samples.

VIKRAMA SIMHAPURI UNIVERSITY: NELLORE
B.A/B.Sc., STATISTICS (WITH MATHEMATICS)
REVISED SYLLABUS
CBCS/SEMESTER SYSTEM (W.E.F 2020-21 ADMITTED BATCH)
SEMESTER – IV
PAPER IV: SAMPLING TECHNIQUES AND DESIGNS OF EXPERIMENTS

UNIT I

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

UNIT II

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. Comparison of systematic sampling with Stratified and SRSWOR.

UNIT III

Analysis of variance : Analysis of variance(ANOVA) –Definition and assumptions. One-way with equal and unequal classification, Two way classification.

Design of Experiments: Definition, Principles of design of experiments, CRD: Layout, advantages and disadvantage and Statistical analysis of Completely Randomized Design (C.R.D).

UNIT IV

Randomized Block Design (R.B.D) and Latin Square Design (L.S.D) with their layouts, Advantages, disadvantages and Analysis. Missing plot technique in RBD and LSD.

UNIT V

Factorial experiments – Main effects and interaction effects of 22 and 23 factorial experiments and their Statistical analysis. Yates procedure to find factorial effect Totals.

Text Books:

1. Telugu Academy BA/BSc III year paper - III Statistics - Applied statistics - Telugu academy by Prof.K.Srinivasa Rao, Dr D.Giri. Dr A.Anand, Dr V.Papaiah Sastry.
2. K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC. PHI.

Reference Books:

1. Fundamentals of applied statistics : VK Kapoor and SC Gupta.
2. Indian Official statistics - MR Saluja
3. Anuvarthita Sankyaka Sastram - Telugu Academy.

Practicals - Paper –IV

Note: Minimum of 10 practicals should be done

Sampling Techniques

Estimation of population mean and its variance by

1. Simple random sampling with and without replacement. Comparison between SRSWR and SRSWOR.
2. Stratified random sampling with proportional and optimum allocations. Comparison between proportional and optimum allocations with SRSWOR.
3. Systematic sampling with $N=nk$. Comparison of systematic sampling with Stratified and SRSWOR.

Design of Experiments:

4. ANOVA - one - way classification with equal and unequal number of observations
5. ANOVA Two-way classification with equal number of observations.
6. Analysis of CRD.
7. Analysis of RBD
8. Estimation of single missing observation in RBD and its analysis
9. Analysis of LSD
10. Estimation of single missing observation in LSD and its analysis
11. Analysis of 2^2 F.E with RBD layout
12. Analysis of 2^3 F.E with RBD layout

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.

Course Learning Outcomes

The students shall get

- 1) Introduced to various statistical sampling schemes such as simple, stratified and systematic sampling.
- 2) an idea of conducting the sample surveys and selecting appropriate sampling techniques,
- 3) Knowledge about comparing various sampling techniques.
- 4) carry out one way and two way Analysis of Variance,
- 5) understand the basic terms used in design of experiments,
- 6) use appropriate experimental designs to analyze the experimental data.

VIKRAMASIMHAPURI UNIVERSITY
THREE YEAR B.A./B.Sc DEGREE EXAMINATION
STATISTICS(WM)
(W.E.F 2020-21 ADMITTED BATCH)
SEMESTER -IV
PAPER 4: SAMPLING TECHNIQUES AND DESIGN OF EXPERIMENTS

Time: 3 Hours

Max. Marks : 75

SECTION – A

Answer any FIVE Questions :-

5 X 5 = 25 M

1. Explain briefly Lottery method to select a simple random sample
2. Show that the Sample mean is UBE of the Population mean in SRSWOR.
3. Define Proportional and Optimum allocations in Stratified Random Sampling
4. write the Merits and Demerits of Systematic sampling.
5. Explain one way ANOVA with equal number of observations
6. Define CRD, Mention advantages, disadvantages of CRD
7. Define RBD, What is the layout of RBD.
8. Estimate the Missing Plot in LSD.
9. What is a Factorial Experiment.
10. What are the advantages of Factorial experiments

SECTION - B

Answer any **FIVE** Questions.

5 X 10 = 50 M

11. In SRSWOR show that $V(\bar{y}) = \frac{N-n}{N} S^2$
12. Show that in SRSWR the sample mean square is an UBE of the Population Variance
13. With usual notations show that $V_{opt}(\bar{y}_{st}) \leq V_{prop}(\bar{y}_{st}) \leq V_{ran}(\bar{y})$
14. If the population consists of a linear trend, show that $V(\bar{y})_{st} \leq V(\bar{y})_{sys} \leq V(\bar{y})_R$
15. Explain the Principles of Design of Experiments
16. Explain Two Way ANOVA
17. Describe LSD and discuss its merits and demerits.
18. Explain Missing Plot Technique in RBD. Also write its statistical analysis.
19. Explain 2^2 Factorial experiment in RBD
20. Explain Yates procedure to find Total Effects.

VIKRAMA SIMHAPURI UNIVERSITY: NELLORE
B.A/B.Sc., STATISTICS (WITH MATHEMATICS)
REVISED SYLLABUS
CBCS/SEMESTER SYSTEM (W.E.F 2020-21 ADMITTED BATCH)
SEMESTER-IV
PAPER V: APPLIED STATISTICS

UNIT I

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

UNIT II

Seasonal Component: Determination of seasonal indices by simple averages method, ratio to moving average, Ratio to trend and Link relative methods

UNIT III

Growth curves: Modified exponential curve, Logistic curve and Gompertz curve, fitting of growth curves by the method of three selected points and partial sums. Use of Growth curves.

UNIT IV

Index numbers: Concept, construction, problems involved in the construction of index numbers, uses and limitations. Simple and weighted index numbers. Laspeyres's, Paasche's, Drobish - Bowley and Fisher's index numbers, Criterion of a good index number, Fisher's ideal index numbers. Cost of living index number and wholesale price index number.

UNIT V

Vital Statistics: Introduction, definition and uses of vital statistics, sources of vital statistics. Measures of different Mortality and Fertility rates, Measurement of population growth. Life tables: construction and uses of life tables.(Derivations not required)

Text Books:

1. Fundamentals of applied statistics : VK Kapoor and SC Gupta.
2. BA/BSc III year paper - III Statistics - applied statistics - Telugu academy by prof.K.Srinivasa Rao, Dr D.Giri. Dr A.Anand, Dr V.Papaiah Sastry.

Reference Books:

1. Anuvarthita Sankyaka Sastram - Telugu Academy.
2. Mukopadhyay, P (2011). Applied Statistics, 2nd ed. Revised reprint, Books and Allied Pvt. Ltd.
3. Brockwell, P.J. and Devis, R.A. (2003). Introduction to Time Series Analysis. Springer.
4. Chatfield, C. (2001). Time Series Forecasting., Chapman & Hall.
5. Srinivasan, K. (1998). Demographic Techniques and Applications. Sage Publications
6. Srivastava O.S. (1983). A Text Book of Demography. Vikas Publishing House

Practical Paper –V

Note: Minimum of 10 practicals should be done

Time Series:

1. Measurement of trend by method of moving averages(odd and even period)
2. Measurement of trend by method of Least squares(linear and parabola)
3. Determination of seasonal indices by method simple averages
4. Determination of seasonal indices by method of Ratio to moving averages
5. Determination of seasonal indices by method of Ratio to trend
6. Determination of seasonal indices by method of Link relatives

Index Numbers:

7. Computation of simple index numbers.
8. Computation of all weighted index numbers.
9. Computation of reversal tests.

Vital Statistics:

10. Computation of various Mortality rates
11. Computation of various Fertility rates
12. Computation of various Reproduction rates.
13. Construction of Life Tables

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.

Course Learning Outcomes

After completion of this course, the students will know about

- 1) time series data, its applications to various fields and components of time series,
- 2) fitting and plotting of various growth curves such as modified exponential, Gompertz and logistic curve,
- 3) fitting of trend by Moving Average method,
- 4) measurement of Seasonal Indices by Ratio-to-Trend , Ratio-to-Moving Average and Link Relative methods,
- 5) Applications to real data by means of laboratory assignments.
- 6) Interpret and use a range of index numbers commonly used in the business sector
- 7) Perform calculations involving simple and weighted index numbers
- 8) Understand the basic structure of the consumer price index and perform calculations involving its use
- 9) Various data collection methods enabling to have a better insight in policy making, planning and systematic implementation,
- 10) Construction and implementation of life tables,
- 11) Population growth curves, population estimates and projections,
- 12) Real data implementation of various demographic concepts as outlined above through practical assignments.

VIKRAMASIMHAPURI UNIVERSITY
THREE YEAR B.A./B.Sc DEGREE EXAMINATION
STATISTICS(WM)
(W.E.F 2020-21 ADMITTED BATCH) SEMESTER –IV

PAPER 5: APPLIED STATISTICS

Time: 3 Hours

Max. Marks : 75

SECTION – A

Answer any FIVE Questions :-

5 X 5 = 25 M

1. Define Time Series. Mention different Models of Time Series data.
2. Describe Linear Trend by the method of Least Squares
3. what are Seasonal Variations
4. Explain simple averages method to determine the Seasonal Indices
5. Define Gompertz Curve and mention two methods to fit the curve.
6. Explain the method of Three Selected Points to fit Modified Exponential curve
7. Define Laspayer's, Pasche's, Fisher's Index numbers
8. Cost of Living Index number
9. What are the Sources of Vital Statistics
10. What are the components of a Life Table.

SECTION – B

Answer any FIVE questions

5 X 10 = 50 M

11. Explain the Components of Time Series
12. Describe the Method of Moving Averages. Also determine Trend values for the following data by taking 3 as moving period

Year	2000	2001	2002	2003	2004	2005	2006
production	30	45	65	79	100	120	150

13. Describe Link Relatives Method to determine Seasonal Indices.
14. Explain Ratio to Trend method to find Seasonal Indices
15. How to Fit Modified Exponential curve using Partial sums method.
16. Explain the method of Three Selected Points to fit Logistic Curve
17. What are the problems involved in the construction of Index Numbers
18. what are the Properties of a Good Index Number
19. Explain various Mortality Rates
20. Discuss various Fertility rates.

VIKRAMASIMHAPURI UNIVERSITY
THREE YEAR B.A./B.Sc DEGREE EXAMINATION
STATISTICS(WM)
(W.E.F 2020-21 ADMITTED BATCH)
STRUCTURE OF QUESTION PAPER
(COMMON TO ALL SEMESTERS)

Time: 3 Hours

Max. Marks : 75

SECTION – A

Answer any FIVE Questions :-

5 X 5 = 25 M

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10

SECTION-B

Answer any FIVE questions :-

5 X 10 = 50M

- 11.
- 12.
- 13.
- 14.
- 15.
- 16.
- 17.
- 18.
- 19.
- 20.

Instruction to Paper Setter :

Two short answer questions (5 Marks) and two essay questions (10 Marks) must be given from each unit.

**VIKRAMA SIMHAPURI UNIVERSITY
NELLORE**

B.A/B.Sc.-STATISTICS(NON MATHEMATICS)



UG (CBCS) SEMESTER PATTERN

REVISED SYLLABUS

(W.E.F 2020-21 ADMITTED BATCH)

I TO IV SEMESTERS

K. Sreemitha
6/9/20

K. Saemini
6/9/20

VIKRAMA SIMHAPURI UNIVERSITY - NELLORE
B.A. / B.Sc., STATISTICS (NON- MATHEMATICS)
REVISED SYLLABUS FOR CORE COURSES
CBCS / SEMESTER SYSTEM (w.e.f.2020-21 ADMITTED BATCH)
COURSE STRUCTURE (SEMESTER-I TO SEMESTER-IV)

Semester	Paper	Title of course	Credits	Hrs	Marks		
					IA	SEE	Total
I	I	Paper - I Elementary Mathematics	4	4	25	75	100
		Practical- 1	1	2	0	50	50
II	II	Paper II - Descriptive Statistics	4	4	25	75	100
		Practical-2	1	2	0	50	50
III	III	Paper - III Statistical Methods and Probability	4	4	25	75	100
		Practical-3	1	2	0	50	50
IV	IV	Paper-IV Probability Distributions, Correlation and Regression	4	4	25	75	100
		Practical-4	1	2	0	50	50
	V	Paper - V Statistical Applications	4	4	25	75	100
		Practical-5	1	2	0	50	50

K. Sreemitha
6/9/20

OBJECTIVE OF THE COURSE

Statistics is a key to success in the field of science and technology. Today, the students need a thorough knowledge of fundamental basic principles, methods, results and a clear perception of the power of statistical ideas and tools to use them effectively in modeling, interpreting and solving the real life problems. Statistics plays an important role in the context of globalization of Indian economy, modern technology, computer science and information technology.

The main objectives of the course are

- To build the basis for promoting theoretical and application aspects of statistics.
- To underline the statistics as a science of decision making in the real life problems with the description of uncertainty.
- To emphasize the relevance of statistical tools and techniques of analysis in the study of inter-disciplinary sciences.
- To acquaint students with various statistical methods and their applications in different fields.
- To cultivate statistical thinking among students.
- To develop skills in handling complex problems in data analysis and research design.
- To prepare students for future courses having quantitative components.

VIKRAMA SIMHAPURI UNIVERSITY: NELLORE

B.A./B.SC I YEAR : STATISTICS

(For Non - Mathematics Combination)

Semester - I CBCS

Paper-I : ELEMENTARY MATHEMATICS

Course Outcomes:

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

1. Have an idea about basic mathematical techniques which are necessary to analyze the Statistical techniques
2. Able to know the concepts of set theory and operations in sets .
3. Able to know the concept of matrices and its operations.
4. Able to complete the adjoint and determinate of a square matrix , hence its inverse.
5. Capable of solving the simultaneous equations using matrix method.
6. Understands the concept of finite differences.

COURSE SYLLABUS:

UNIT-I :

Types of matrices -Matrix addition and subtraction - Matrix multiplication-Transpose of a matrix, row matrix, column matrix, Symmetric and skew symmetric matrices.

UNIT-II:

Singular and Non-Singular Matrices, Determinant of a square matrix, Ad joint of a square matrix, Inverse of square matrix Up to 3 order only.

UNIT-III:

Definition of a Rank, Rank of a Matrix through determinant method up to 3 order only

Solution of Linear Equations.

- (i) Algebraic Method
- (ii) Cramer's Rule
- (iii) Matrix Inversion Method

K. Sreemitha
6/9/20

UNIT – IV :

Set, Subset, Types of Sets, Operations on sets, Demorgan Laws – statements only.

UNIT-V:

Finite Differences - Forward Differences - Backward differences.

Newton's forward interpolation formula - Newton's backward interpolation formula

Note : 1. Concentration on numerical problems Only.

2. Proofs of theorems and Derivations of expressions are omitted.

Text Books:

1. Differential Calculus - Santhi Narayana.
2. Outlines of Matrices – Schaum.

Reference Books:

1. Statistical methods - S.P. Gupta.
2. Fundamentals of Mathematical statistics - SC Gupta and V.K.Kapoor.
3. Quantitative Techniques1 –Sulthan Chand Publication.

Paper-1 Practicals:

1. Addition, Subtraction of Matrices.
2. Multiplication of Matrices.
3. Adjoint of a Matrix
4. Inverse of a Matrix
5. Rank of a Matrix
6. Linear equations
7. Union and Intersection on sets
8. Operation on sets
9. Newton's forward interpolation formula
10. Newton's backward interpolation formula

BLUE PRINT OF QUESTION PAPER

(INSTRUCTIONS TO PAPER SETTER)

B.A./B.Sc. STATISTICS SYLLABUS(NON-MATHEMATICS)

Semester - I CBCS: Paper-I : ELEMENTARY MATHEMATICS

NOTE: - Paper Setter Must select TWO Short Questions and TWO Easy Questions from Each Unit as Follows

UNIT	TOPICS	5 MARKS	10 MARKS
UNIT-I	Matrix addition, subtraction and Multiplication Transpose of a matrix	2 (PROBLEMS)	2 (PROBLEMS)
UNIT-II	Singular and Non Singular matrices and Determinant	2 (PROBLEMS)	----
	Adjoint and Inverse Matrix	----	2 (PROBLEMS)
UNIT-III	Rank of Matrix	1 (PROBLEM)	1 (PROBLEM)
	Linear Equations	1 (PROBLEM)	1 (PROBLEM)
UNIT-IV	Sets	2 (PROBLEMS)	2 (PROBLEMS)
UNIT-V	Forward Differences Backward differences	2 (PROBLEMS)	----
	Newton's Forward interpolation Newton's backward interpolation	----	2 (PROBLEMS)

K. Sreenivas
6/9/20

B.A/B.Sc I YEAR : STATISTICS MODEL PAPER

(NON-MATHEMATICS COMBINATION)

SEMESTER-I: PAPER-I

ELEMENTARY MATHEMATICS

(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=25M

1. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ then Prove that $(A^T)^T = A$

2. If $A = \begin{bmatrix} 1 & 2 \\ 1 & 1 \end{bmatrix}$ then find $A^2 + A + I$

3. Define Singular Matrix. Write one example for Singular Matrix.

4. Classifying square matrices as singular or non-singular

$$A = \begin{bmatrix} 0 & 2 & -1 \\ 3 & -2 & 1 \\ 3 & 2 & -1 \end{bmatrix} \quad B = \begin{bmatrix} 0 & 2 & -1 \\ 3 & -2 & 1 \\ 3 & 2 & 1 \end{bmatrix}$$

5. Define Rank of a Matrix. Find the Rank of $\begin{bmatrix} 6 & 4 \\ 3 & 2 \end{bmatrix}$

6. Solve the following system of Linear equations.

$$2x + 3y = 8, 5x - y = -2$$

7. If $A = \{5, 6, 7, 8, 9\}$, $B = \{2, 4, 6, 8, 10\}$, find (i) $A \cup B$ (ii) $A \cap B$ and examine they are equal or not

8. If $A = \{3, 4, 5, 6, 7\}$, $B = \{5, 6, 7, 8, 9\}$, find (i) $A - B$ (ii) $B - A$ and examine they are equal or not.

9. Find the forward difference table for the following data

x	35	45	55	65	75
y	200	220	243	270	289

10. Construct backward difference table to the following data and find $\nabla^2 y_2, \nabla^4 y_2$

x	0	1	2	3	4	5	6
y	0	1	16	81	256	625	1296

K. Sreemitha
6/9/20

SECTION-B

ANSWER ANY FIVE QUESTIONS.EACH QUESTION CARRIES 10 MARKS

5X10=50

11. $A = \begin{bmatrix} 1 & 2 \\ 0 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 5 \\ 1 & 0 \end{bmatrix}$ then find (i) AB (ii) BA (iii) $A + B$ (iv) $(A + B)^T$ (v) $A - B$

12. Evaluate $A^2 - 3A + 9I$ where $A = \begin{bmatrix} 1 & -2 & 3 \\ 2 & 3 & -1 \\ -3 & 1 & 2 \end{bmatrix}$ and I is the unit Matrix.

13. If $A = \begin{bmatrix} 2 & 0 & 1 \\ 4 & -2 & 3 \\ 0 & 4 & -1 \end{bmatrix}$ then find $|A|$ and $\text{adj}A$

14. Find the Inverse of $\begin{bmatrix} 2 & 1 & 1 \\ 3 & 2 & 1 \\ 2 & 1 & 2 \end{bmatrix}$

15. If $A = \begin{bmatrix} 3 & -2 & 1 \\ 0 & 1 & 5 \\ 4 & 2 & 6 \end{bmatrix}$ then find Rank of A

16. Solve the equations by using Cramer's Rule $x - y + z = 3, 2x + y + z = 4, 3x + y - 2z = 2$

17. If $\mu = \{1, 3, 5, 7, 9, 11\}, A = \{3, 5, 7, 11\}, B = \{1, 5, 7, 11\}$ then find

(i) $A \cup \mu$ (ii) $B \cup \mu$ (iii) $A \cap \mu$ (iv) $B \cap \mu$ (v) A^c (vi) B^c

18. If $\mu = \{1, 2, 3, 4\} A = \{2, 4\}$ then show that (i) $A \cup A^c = \mu$ (ii) $A \cap A^c = \phi$

19. Find $f(1.6)$ using Newton's forward Interpolation formula from the following table

x	1	1.4	1.8	2.2
y	3.49	4.82	5.96	6.5

20. Find $f(3.5)$ by Newton's Backward Interpolation formula from the following data

x	0	1	2	3	4
y	3	4	7	8	10

K. Sireem
6/9/20

B.A./B.SC I YEAR : STATISTICS SYLLABUS

(For Non - Mathematics Combination)

Semester - II CBCS

PAPER - II : DESCRIPTIVE STATISTICS

Course Outcomes:

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

- 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 in diagrammatic representation.
- 3) Brief analyzing in different types of data and tabulated.
- 4) knowledge of various types of data, their organization and evaluation of summary measures such as measures of central tendency and dispersion etc.
- 5) insights into preliminary exploration of different types of data.

COURSE SYLLABUS:

UNIT - I

Introduction to Statistics: Statistics Definition, primary and secondary data, methods of collecting primary and secondary data. Statistical enquiry, questionnaire and schedule.

UNIT – II

Classification and tabulation: classification of data, frequency distribution, rules of tabulation, simple and complex tables, single, double and manifold tables.

UNIT – III

Diagrammatic Representation : Bar diagrams, pie charts. Histogram, frequency polygon, ogives.

UNIT-IV

Measures of Central Tendency: Mean, Median, Mode, merits and demerits, finding median by graphic method, quartiles.

UNIT-V

Measures of Dispersion: Range, Q.D, S.D, M.D, Coefficient of variation.

Note : 1. Concentration on numerical problems Only.

2. Proofs of theorems and Derivations of expressions are omitted.

K. Sreemitha
6/9/20

Text Books:

1. Statistical methods - S.P. Gupta.
2. Fundamentals of Mathematical statistics - SC Gupta and V.K. Kapoor

Reference Books :

Quantitative Techniques1 –Sulthan Chand Publication

Paper-2: Practicals:

1. Arithmetic Mean, Median, Mode
2. Calculation of CV and its comparisons.
3. Bar diagrams.
4. Pie diagram.
5. Histogram.
6. Frequency polygon.
7. O give curves.
8. Quartile Deviation
9. Mean Deviation
10. Standard Deviation.

B.A/B.Sc I YEAR : STATISTICS MODEL PAPER

(NON-MATHEMATICS COMBINATION)

SEMESTER-II: PAPER-II

DESCRIPTIVE STATISTICS

(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=25M

1. Explain Various definitions of Statistics.
2. Define Primary data and secondary data.
3. Write rules of tabulation.
4. Explain frequency distribution with one example.
5. Construct frequency polygon for the following data

Class interval	Mid values	No.of employees
0-10	5	2
10-20	15	4
20-30	25	8
30-40	35	3
40-50	45	5

6. Define o give curves.
7. Compute mean from the following frequency distribution.

x	1	2	3	4	5	6	7
y	5	9	12	17	14	10	6

8. Find the Median and Mode from the following data

4,5,6,4,5,4,10

9. Compute Quartile deviation from the following data

Marks	10	20	30	40	50	60
No.of Students	4	7	15	8	7	2

K. Sreemitha
6/9/20

10. If mean of a distribution is 160, Mode 157 and Standard distribution is 50 then find Coefficient of variation.

SECTION-B

ANSWER ANY FIVE QUESTIONS.EACH QUESTION CARRIES 10 MARKS

5X10=50M

11. Explain various methods of collecting primary data.

12. Explain Questionnaire and schedule.

13. Classification of 100 students based on the marks obtained by them in physics and chemistry in an examination. It is shown in the below table:

Marks out of 50/Subject	40 and above	30 and above	20 and above	10 and above	0 and above
Physics	9	32	80	92	100
Chemistry	4	21	66	81	100
Average	7	27	73	87	100

(i) what is the number of students scoring less than 40% marks in aggregate.

(ii) If at least 60% marks in physics are required for pursuing higher studies in physics, how many students will be eligible to pursue higher studies in physics.

14. Define tabulation. Explain various types of tables.

15. Draw histogram for the following data

Age	2-5	5-11	11-12	12-14	14-15	15-16
No. of Boys	6	6	2	5	1	3

16. Prepare pie chart for expenditure in book publishing for the following data

Items of expenditure	Family A	Family B
Food	12000	15000
Clothing	5000	8000
House rent	15000	12000
Education	18000	5000
Miscellaneous	10000	10000

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17. Calculate Arithmetic mean of the marks from the following data

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of students	12	18	27	20	17	6

18. Find the mode of the following data

Marks	0-10	10-20	20-30	30-40	40-50
No. of students	3	15	7	10	12

19. Calculate mean deviation from the following data

x	5	10	15	20	25	30
f	3	4	8	12	7	2

20. Compute Coefficient of Quartile deviation to the following data

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Students	10	15	28	32	40	35	26	14	10	5

B.A./B.SC II YEAR : STATISTICS SYLLABUS

(For Non - Mathematics Combination)

Semester - III CBCS.

PAPER - III : STATISTICAL METHODS AND PROBABILITY

Course Outcomes:

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

- 1) Knowledge related to concept of attributes.
- 2) knowledge of other types of data reflecting quality characteristics including concepts of independence and association between two attributes.
- 3) knowledge to conceptualize the probabilities of events including frequent and axiomatic approach. Simultaneously, they will learn the notion of conditional probability.
- 4) knowledge related to concept of discrete and continuous random variables and their probability distributions including expectation and moments,
- 5) knowledge related to concept of random variable, Probability mass function and probability density function.
- 6) knowledge related to concept of Mathematical expectation.

COURSE SYLLABUS:

UNIT-I

Attributes: Classes, 2x2, manifold classification, class frequencies, ultimate classes frequencies, contingency tables, association and independence of attributes, consistency of data, coefficient of colligation.

UNIT -II

Moments: Central and Non - Central moments, Sheppard's correction for moments for grouped data. Skewness, kurtosis, and their measures.

UNIT-III

Concept on Permutations and Combinations.

Probability: Definitions of random experiment, outcome, sample space, event, mutually exclusive event, equally likely events, favorable events, classical, statistical and axiomatic definitions of probability. Addition and multiplication theorems for two events. Conditional probability.

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UNIT-IV

Random variable : Discrete - Probability mass function. Continuous Random Variable - Probability density function, distribution function of a R.V and properties.

UNIT-V

Mathematical expectation: Basic results & properties of M.G.F, C.G.F, C.F

Note : 1. Concentration on numerical problems Only.

2. Proofs of theorems and Derivations of expressions are omitted.

Text Book:

1. Statistical Methods by S.P.Gupta.

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

Reference books:

1. Sambavyatha - Telugu Academy.

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

Paper-3: Practicals:

1. Non central Moments
2. Central Moments
3. Sheppard's corrections,
4. skewness
5. Kurtosis.
6. Coefficients of Association and colligation
7. Attributes
8. Probability
9. Random variable
10. Mathematical Expectation

B.A/B.Sc II YEAR : STATISTICS MODEL PAPER

(NON-MATHEMATICS COMBINATION)

SEMESTER-III: PAPER-III

STATISTICAL METHODS AND PROBABILITY

(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.Explain independent of Attributes.
2. Define Coefficient of Colligation.
3. The first four non central moments of a distribution are -1.5,17,-30 and 108.Find Moments
4. Write Sheppard correction for moments.
5. Define random experiment and sample space.
6. In a single throw with two dice find the probability of throwing a sum (i)10 (ii) which is a perfect square.
7. Define Random variable.
8. A random variable X has the following probability function

$X = x$	-2	-1	0	1	2	3
$P(X = x)$	0.1	K	0.2	2k	0.3	K

- 9.Define Mathematical Expectation.
10. Write the additive property of M.G.F

SECTION-B

ANSWER ANY FIVE QUESTIONS.EACH QUESTION CARRIES 10 MARKS

5X10=50

11. Given the following ultimate class frequencies , find the frequencies of positive class.

$$(ABC) = 149 \quad (AB\gamma) = 738 \quad (A\beta C) = 225 \quad (A\beta\gamma) = 1196$$

$$(\alpha BC) = 204 \quad (\alpha B\gamma) = 1762 \quad (\alpha\beta C) = 171 \quad (\alpha\beta\gamma) = 21842$$

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12. Find if A and B are independent, positively associated or negatively associated in each of the following data.

(i) $N = 1000, (A) = 470, (B) = 620, (AB) = 320$

(ii) $(A) = 490, (AB) = 294, (\alpha) = 570, (\alpha B) = 380$

(iii) $(AB) = 256, (\alpha B) = 768, (A\beta) = 48, (\alpha\beta) = 144$

13. Calculate the first four central moments of the following distribution about mean and hence find β_1 and β_2

x	0	1	2	3	4	5	6	7	8
f	1	8	28	56	70	56	28	8	1

14. For a distribution the mean is 10, variance is 16, γ_1 is 1 and β_2 is 4. Obtain the first four moments about the origin.

15. If $P(A) = \frac{1}{3}, P(B) = \frac{1}{4}, P(A \cup B) = \frac{23}{60}$ then find $P\left(\frac{A}{B}\right), P\left(\frac{B}{A}\right)$

16. Define conditional probability. State multiplication theorem for two events.

17. Explain properties of distribution function.

18. A random variable X has the following probability function.

$X = x$	0	1	2	3	4	5	6	7
$P(X = x)$	0	K	$2K$	$2K$	$3K$	K^2	$2K^2$	$7K^2 + K$

Find (i) K (ii) Mean (iii) Variance

19. Find expected number of heads in tossing three coins.

20. Write the properties of C.G.F

B.A./B.SC II YEAR : STATISTICS SYLLABUS

(For Non - Mathematics Combination)

Semester -IV CBCS.

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.

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

Paper-4: Practicals:

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

B.A/B.Sc II YEAR : STATISTICS MODEL PAPER

(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.

SECTION-B

ANSWER ANY FIVE QUESTIONS.EACH QUESTION CARRIES 10 MARKS

5X10=50

11. A fair coin is tossed six times. Find the probability of getting four heads.
12. 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?
13. Write properties of Normal distribution.
14. If X is uniformly distributed with mean 1 and variance $\frac{4}{3}$ find $P(X < 0)$.

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15. 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

16. 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

17. 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

18. 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

19. Calculate regression equation of Y on X from the following data

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

20. Write difference between correlation and regression.

B.A./B.SC II YEAR : STATISTICS SYLLABUS

(For Non - Mathematics Combination)

Semester - IV CBCS.

PAPER - V : STATISTICAL APPLICATIONS

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

Statistical Inference –Estimation: Definitions of population, Sample, Parameter, Standard Error. Estimation - Criteria of a good estimator, meaning of interval estimation.

UNIT-II

Statistical Hypothesis – large sample Test : Null and alternative hypothesis, level of significance, type **I** and type **II** errors, power of the test. Large sample tests for proportion (Single & double), mean (Single & double).

UNIT-III

Exact Sampling Distributions : Random Sample, Statistic, Sampling Distribution of a Statistics, Statement and properties of χ^2 , t , F distributions and applications.

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UNIT - IV

Small sample tests : Tests of significance based on χ^2 , t and F. χ^2 -test for independence of attributes, t-test for single, double and paired tests, Variance Ratio Test(F-test).

UNIT – V

Non parametric tests : Advantages, disadvantages, sign test, median test and run test for two sample cases only.

- 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. Anuvarthita Sankhyaka Sastram - Telugu academy book.
2. Applied Statistics - V.K.Kapoor & S.C Gupta.
3. Applied statistics - Parimal Mukhopadhyay.

Paper-5: Practicals:

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

**B.A/B.Sc II YEAR : 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 null and alternative hypothesis.
4. Explain type I and type II errors.
5. Define random sample and statistic.
6. Define t-distribution.
7. 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.
8. 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.
9. Explain sign test.
10. Explain median test.

K. Saheem
6/9/20

SECTION-B

ANSWER ANY FIVE QUESTIONS.EACH QUESTION CARRIES 10 MARKS

5X10=50

11. Explain criteria of good estimator.
12. Define standard error. The variance of population is 2. The size of the sample collected from the population is 169. What is the standard error of mean.
13. Random samples of 400 men and 600 women were asked whether they would like to have a flyover near their residence. 200 men and 325 women were favor of the proposal. Test the hypothesis that proportions of men and women in favor of the proposal are same at 5%level.
14. The means of two large samples of sizes 1000 and 2000 members are 67.5 inches and 68.0 inches respectively. Can the samples be regarded as drawn from the same population of S.D 2.5 inches.
15. Define χ^2 distribution and explain its applications.
16. Define t distribution and explain its applications.
17. The means of two random sample sizes 9 and 7 are 196.42 and 198.82 respectively. The sum of the squares of deviations from the mean are 26.94 and 18.73 respectively. Can the sample be considered to have been drawn from the same normal population.
18. It is known that mean diameters of rivets produced by two firms A and B are practically the same, but the standard deviations may differ. For 22 rivets produced by firm A, the S.D is 2.9 mm, while for 16 rivets manufactured by firm B, the S.D is 3.8 mm. Compute the Statistic you would use to test whether the products firm A have the same variability as those of firm B and test its significance.
19. Explain advantages and disadvantages of non parametric tests.
20. Explain run test for randomness.

VIKRAMA SIMHAPURI UNIVERSITY :: NELLORE
UG (CBCS) SEMESTER WISE EXAMINATION
STATISTICS(NON-MATHEMATICS COMBINATION)
QUESTION PAPER STRUCTURE

Time: 3 Hours

Max. Marks : 75

SECTION- A

Answer any FIVE Questions :-

5 X 5 = 25M

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

SECTION- B

Answer any FIVE questions :-

5 X 10 = 50M

- 11.
- 12.
- 13.
- 14..
- 15.
- 16.
- 17.
- 18.
- 19.
- 20.

Instruction to Paper Setter :

**Two short answer questions (5 Marks) and
Two essay questions (10 Marks) must be given from each unit.**

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6/9/20