



Dr.V.S.Krishna Govt. Degree College(A) Visakhapatnam



DEPARTMENT OF STATISTICS

PROPOSED SYLLABUS FOR STATISTICS

IN UNDERGRADUATE DEGREE PROGRAMME

UNDER AUTONOMY

(With effect from 2022-23)

Dr.V.S.Krishna Govt. Degree College (Autonomous), Visakhapatnam

8th Board of Studies---September-2022

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**Dr. V. S. KRISHNA GOVT. DEGREE COLLEGE (A),
VISAKHAPATNAM
DEPARTMENT OF STATISTICS
BOARD OF STUDIES - MINUTES OF THE MEETING
2022 – 2023**

The Board of Studies of the Department of STATISTICS met on **28.09.2022 at 10.00AM** under the Chairmanship of Dr. K.Ravibabu and resolved the following:

- 1) To adopt Choice Based Credit System as per the Staff Councils proceedings commencing from the academic year 2022 – 2023 for Semester I, II, III, IV, V and VI of B.Sc. students.
- 2) To approve and introduce the newly framed syllabus (modified and approved by the BOS) for Semester I, II, III, IV, V and VI course in Statistics. The newly framed syllabus is oriented in such a fashion that it caters to the needs of the students and to meet the present-day job employability and to develop professionalism in the field of Statistics.
- 3) To ratify and introduce the semester mode pattern of examinations for Semester I, II, III, IV, V and VI students (M.P.C., M.P.Cs, M.C.IC & M.S.Cs. groups). Further it is approved and ratified syllabus, blue print and the model question papers submitted by the concerned faculty members for Semester I, II, III, IV, V and VI.
- 4) To approve / ratify new employable and skill-based programs from 2022-23. To adopt NAAC norms by introducing quality circles among student community.
- 5) To approve/ ratify for 25 internal marks as a part of Continuous Internal Assessment for core courses and allocation of marks as per Table-I.
- 6) To approve/ ratify question paper blue print, model question papers for 75 external marks and allocation of marks and the pattern of the paper as per Table-II.
- 7) To approve/ ratify minimum pass percentage of semester end theory examinations as 40% of 25 internal + 75 externals =100.
- 8) To approve / ratify practical examinations for each core courses for semester I, II, III, IV, V and allocation of marks Table-IIA.
- 9) To approve / ratify Internship-I for 1st year students at the end of sem-II and sem-IV w.e.f. 2022-23 as per **NEP-2020** and allocation of marks as per table-III.
- 10) To approve/ ratify Internship-II, two months training program for 2nd year students at the end of IV-semester w.e.f. 2022-23 as per **NEP-2020** and allocation of marks as per table-IV.
- 11) To approve Internship-III, six months on Job training program for 3rd year students (after IV-semester) as VI-semester w.e.f. 2022-23 as per **NEP-2020** and allocation of marks as per Table-V.

- 12) To approve / ratify list of examiners as per Table-VI.
- 13) To implement pedagogical strategies to enrich teaching and learning process and to implement Blended learning teaching process.
- 14) To approve suggestions for students' seminars, workshops and student-centered activities.
- 15) To approve suggestions for research and extension activities or start-up.
- 16) To encourage students to take up independent research projects at their level by providing facilities.
- 17) To adopt NAAC norms by introducing quality circles among student communities.
- 18) To develop infrastructure facilities in the department and implement guidelines of the academic council.
- 19) To take up ICT mode of teaching and evolve techniques that are easily understanding by the students and conduct remedial coaching to the below average students.
- 20) To encourage students to join JKC to equip with communication skills and improve their personality development.
- 21) To encourage students to participate in the community development activities such as Haritha Krishna Eco Club, NCC and NSS.

Signed and approved by

Prof. B. Muniswamy
Subject Expert
(University Nominee)

Dr. N. Madhavi
Subject Expert
(from outside the parent
university)



Dr. V.Rohini Kumari
Subject Expert
(from outside the parent
university)

Table-I: Allocation of Internal Marks as a part of Continuous Internal Assessment methods:

w.e.f. 2022-23			
Assessment	Marks for each Mid examination	Time	Pass Mark
Assignments (at least one assignment from each unit) *The weightage of marks, for the assignments should be awarded after completion of all the assignments which are finished before the mid examinations are commenced.	10	50min	The marks obtained by a student for 100 marks in both mid examination is to be scale down to 25 marks. Minimum Pass marks 9
Projects/Seminars/PPT/Quizzes/Field trips etc.	10	NA	
External Activities like clean & green, NCC, NSS and attendance Attendance should be also be taken into account for awarding the total of 5 marks. The award of marks should be completed before conduct of the mid examination commenced.	10	NA	
Internal examination pattern for both Mid1 and Mid2 : Section-A Answer any two out of five $2 \times 5 = 10$ Section-B Answer any five out of seven $5 \times 2 = 10$ ** One mid examination may be conducted through online mode**	20	1 hour	
Total	50		
The marks obtained by a student for 100 marks in both mid examination is to be scale down to 25 as internal marks.			

Table-II: Allocation of External Marks for semester end theory examinations:

Duration of the exam	3 hrs.
Maximum marks	75 marks
Minimum pass marks	27
Paper pattern	Section A for 25 marks: In Section A, answer any 5 questions out of 8, each carry 5 marks. (5X5=25) Section B for 50 marks: In section B, answer all 5 questions (there will be an internal choice), each question carry 10 marks

Table-IIA: Allocation of Practical marks:

Category	Marks
Record	20
Problem solving	60
Viva-voce	20
Maximum marks	100
Minimum pass marks	50

Table-III: Allocation of Internship-I Marks:

Category	Marks
Implementation	50
Project Report	25
Presentation	25
Total marks	100
Minimum pass marks	50

Table-IV: Allocation of Internship-II Marks:

Category	Marks
Implementation	50
Project Report	25
Presentation	25
Total marks	100
Minimum pass marks	50

Table-V: Allocation of Internship-III Marks:

Category	Marks
Implementation	50
Project Report	25
Presentation	25
Viva voce at the industry or company	50
Viva voce at college	50
Total marks	200
Minimum pass marks	100

Table-VI: List of Examiners:

Name of the Examiners	Designation	Place of working
Dr. P. Konda Babu	Lecturer in Statistics	G.D.C., Araku
Dr. N. Madhavi	Lecturer Statistics	G.D.C(A), Rajmundry
Dr. V. Rohini Kumari	Lecturer in Statistics	G.D.C (A), Anantapur
Sri. P. Govind	Lecturer in Statistics	AVN College, Visakhapatnam
Sri. M. Naresh	Lecturer in Statistics	M.R. College Visakhapatnam
Sri. M. Venkata Lakshmi	Lecturer in Statistics	M.R. College Visakhapatnam

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Dr.V.S.Krishna Govt. Degree College (Autonomous), Visakhapatnam
8th Board of Studies----- September-2022
Pre-Approval form

Subject: Statistics

Department: Statistics

In pursuance of conferment of Autonomous status to Dr.V.S.Krishna Govt. Degree College(A), Visakhapatnam by the UGC vide letter No.F22-1/2011(AC) dated 20.07.2011 from Dr. Manju Singh, Joint Secretary, UGC, New Delhi and Proceedings No. C-II (CDC) /Dr.VSK.Govt.College/BOS/2020 dt.03.08.2022 of The Vice-Chancellor, Andhra University, Visakhapatnam, the **8th Board of Studies in Statistics** Subject is conducted on 28.09.2022 at 10 AM with the following members. The Changes will be implemented from 2022-23 academic year onwards.

MEMBER	NAME& DESIGNATION	SIGNATURE
Head of the Department (Chairman)	Dr. K. Ravibabu	
Faculty Members	Dr. K. Ravibabu	
	Sri. T. Triveni	
	Mr. G. Tharun	
Subject Expert (University Nominee)	Prof. B. Muniswamy, Dept of Statistics, Andhra University.	
Subject Experts (from outside the parent university)	Dr.N. Madhavi, Lecturer in Statistics, G.D.C(A), Rajmundry	
	Dr. V. Rohini Kumari, Lecturer in Statistics, G.D.C (A), Anantapur	 28/9/2022
Representative Member From Industry / Corporate / Allied Area relating to placement	Sri. Srinu Babu Senior Software Engineering L&T Software Technology Visakhapatnam	
Member from Alumni	Dr. Kondru Sai Visakhapatnam	
Coordinator, IQAC	Dr.Ch. Lalitha	
Academic Coordinator and member secretary, Academic Council	Dr. P. Latha	
Principal and Chairperson, Academic Council	Dr.I. Vijayababu	

Dr.V.S.Krishna Govt. Degree College (Autonomous), Visakhapatnam
8th Board of Studies----- September-2022

Department: Statistics
Courses Structure

<i>Courses</i>	<i>Sem-I</i>	<i>Sem-II</i>	<i>Sem-III</i>	<i>Sem-IV</i>	<i>Sem-V</i>	<i>Sem- VI</i>
Life Skills	1 (02)	1 (02)	2 (04)			*****
Skill Development	1 (02)	2 (04)	1 (02)			*****
Language – 1	C-1 (04)	C-2 (04)	C-3 (04)			*****
Language – 2	C-1 (04)	C-2 (04)	C-3 (04)			*****
Domain Sub -1	C-1 (06)	C-2 (06)	C-3 (06)	C-4 (06)	SEC-1(06)	*****
				C-5 (06)	SEC-2 (06)	*****
Domain Sub -2	C-1 (06)	C-2 (06)	C-3 (06)	C-4(06) C-5(06)	SEC-1(06) SEC-2 (06)	*****
Domain Sub -3	C-1 (06)	C-2 (06)	C-3 (06)	C-4(06) C-5(06)	SEC-1(06) SEC-2 (06)	*****
Community Service Project	*****	CSP	*****	*****	*****	*****
Internship I	*****	*****	*****	Training programme	*****	*****
Internship II	*****	*****	*****	*****	*****	On Job Training

* Figures in parenthesis are hours per week of Core Courses of Science. In respect of Arts and Commerce Courses, the hours per week for Core Courses will be 5.

** SEC1 and SEC-2 in Sem-V are C-6 and C-7 respectively.

Dr.V.S.KRISHNA GOVT.DEGREE COLLEGE (A), VISAKHAPATNAM.

B.A./B.Sc. STATISTICS

REVISED SYLLABUS FOR CORE COURSES

CBCS/ SEMESTER SYSTEM

(w.e.f. 2022-23)

CORE COURSES STRUCTURE

(Sem-I to Sem-VI)

Semester	Course	Subject	Hrs.	Credits	IA	ES	Total
I	Course –I	Descriptive Statistics	4T+2P	5	25	75	100
II	Course –II	Probability Theory and Distributions	4T+2P	5	25	75	100
	Internship	Internship-I (after completion of II-Semester)	100 (Total Hrs. for doing CSP)	4			100
III	Course –III	Statistical Inference	4T+2P	5	25	75	100
IV	Course –IV	Sampling Techniques and Design of Experiments	4T+2P	5	25	75	100
	Course –V	Applied Statistics	4T+2P	5	25	75	100
	Internship	Internship -II (after completion of IV-Semester)	100 (Total Hrs. for doing CSP)	4			100
	Course – VI-A	Operations Research - I	4T+2P	5	25	75	100
	Course – VII-A	Operations Research - II	4T+2P	5	25	75	100
	OR						

V	Course – VI-B	Statistical Process and Quality Control	4T+2P	5	25	75	100
	Course – VII-B	Demography & Vital Statistics	4T+2P	5	25	75	100
	OR						
	Course – VI-C	Forestry Methods	4T+2P	5	25	75	100
	Course – VII-C	Advanced Experimental Design	4T+2P	5	25	75	100
VI	Internship			4			100

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Subject Expert
(from outside the parent
university)

Dr.V.S.KRISHNA GOVT.DEGREE COLLEGE (A), VISAKHAPATNAM.
CBCS/ SEMESTER SYSTEM
B.A./B.Sc. STATISTICS
(w.e.f. 2022-23)

Aim and objectives of UG program in Subject:

Aim: The aim of introducing Statistics as a course in Under Graduate is to encourage and enable students to:

- i) Develop interest towards inductive and deductive reasoning in problem solving.
- ii) Apply Statistics methods to solve physical/chemical problems.
- iii) Develop the skills and knowledge to pursue higher studies in mathematics.

Objectives: At the end of the programme Student will be able to

- i) Understand the concepts from five courses of Statistics
(Descriptive Statistics, Probability Theory and Distributions, Statistical Inference, Sampling Techniques and Design of Experiments, Applied Statistics, Operations Research, Statistical Process and Quality control, Operation Research-II, Demography and Vital Statistics, Forecasting Methods, Advanced Experimental Design)
- ii) Apply Statistical techniques or problem solving.

Learning outcomes: (in consonance with the Bloom's Taxonomy):

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

- 1. Distinguish among measures of central tendency and dispersion.
- 2. Expound upon the concept of probability, random variables and mathematical expectation.
- 3. Distinguish among discrete and continuous distributions.
- 4. Describe the correlation, regression and curve fitting with examples.
- 5. Understand the concepts of testing of hypothesis, estimation theory, difference between small and large sample test.
- 6. Distinguish among simple, systematic and stratified random sampling.
- 7. Distinguish among CRD, RBD and LSD.
- 8. Understand the concepts of time series, seasonal components, vital statistics and growth curves.
- 9. Solve linear programming problem.

COURSE - I

CBCS / SEMESTER SYSTEM

B.A. / B.Sc. STATISTICS (w.e.f. 2022-23)

DESCRIPTIVE STATISTICS

SYLLABUS

Course Outcomes:

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

- Know about the role of statistics in different fields with special reference to business and economics.
- Get the knowledge of measures of dispersion.
- Basic idea of probability.
- Get the knowledge of Random Variable, Mathematical Expectation

Credits = 5 (theory 4+ practical 1)

Course syllabus:

Module-I (12 Hrs.)

Introduction to Statistics: Importance of Statistics. Scope of Statistics in different fields. Various statistical Organizations in India and their functions for societal developments. Concepts of primary and secondary data. Diagrammatic and graphical representation of data: Histogram, frequency polygon, Ogives, Pie. Measures of Central Tendency: Mean, Median, Mode, Geometric Mean and Harmonic Mean. Median and Mode through graph.

Module -II (12 Hrs.)

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.

Module -III (12 Hrs.)

Introduction to Probability: Basic Concepts of Probability, random experiments, trial, outcome, sample space, event, mutually exclusive and exhaustive events, equally likely and favorable 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 Bayes' theorem and its applications in real life problems.

Module -IV (12 Hrs.)

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. Simple Problems For given pmf, pdf calculation of moments, coefficient of skewness and kurtosis.

Additional Inputs:

Bivariate random variable - meaning, joint, marginal and conditional Distributions, independence of random variables and simple problems.

Module -V (12 Hrs.)

Mathematical expectation: Mathematical expectation of a random variable and its Properties 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. Chebyshev and Cauchy - Schwartz inequalities.

(**Important Note:** The external examination paper setter should not set the questions from

Additional Inputs

Co-curricular activities (15 Hrs.)

Seminar or quiz or assignment or applications of Descriptive Statistics two real life problem or problem solving.

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, DrN.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. Jagan Mohan Rao and Papa Rao: A Text book of Statistics Paper-I.

Practical-Course-I

1. Graphical presentation of data (Histogram, frequency polygon, Ogives).
2. Diagrammatic presentation of data (Bar and Pie). Construction on Ogive curves
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, β_1 and β_2 for ungrouped data.
6. Computation of non-central, central moments, β_1 and β_2 and Sheppard's corrections for grouped data.
7. Computation of Karl Pearson's coefficients of Skewness and Bowley's coefficients of Skewness.

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.

Signed and approved by

Prof. B. Muniswamy
Subject Expert
(University Nominee)

Dr. N. Madhavi
Subject Expert
(from outside the parent
university)


28/9/2022
Dr. V. Rohini Kumari
Subject Expert
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university)

Dr. V. S. KRISHNA GOVT.DEGREE COLLEGE (A), VISAKHAPATNAM.

COURSE-II
CBCS/ SEMESTER SYSTEM
(w.e.f. 2022-23)
B.A./B.Sc. STATISTICS
PROBABILITY THEORY AND DISTRIBUTIONS

Course Outcomes:

After successful completion of this course, student will be

- Distinguish between random and non-random experiments,
- Get the knowledge to conceptualize the probabilities of events including frequenters and axiomatic approach. Simultaneously, they will learn the notion of conditional probability including the concept of Bayes' Theorem,
- Relate to concept of discrete and continuous random variables and their probability distributions including expectation and moments,
- Knowledge of important discrete and continuous distributions such as Binomial, Poisson, Geometric, Negative Binomial and Hyper-geometric, normal, uniform, exponential, beta and gamma distributions,
- Acumen to apply standard discrete and continuous probability distributions to different situations.

Credits = 5 (theory 4+ practical 1)

Course Syllabus:

Module -I (12 Hrs.)

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

Module – II (12 Hrs.)

Continuous Distributions: Rectangular, Exponential, Gamma, Beta Distributions: mean , variance, M.G.F, C.G.F, C.F. Normal Distribution: Definition, Importance, Properties, M.G.F, CF, additive property.

Module -III (12 Hrs.)

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. Concept of multiple and partial correlation coefficients (three variables only) and properties

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.

Module-IV (12 Hrs.)

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

Module -V (12 Hrs.)

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.

Additional Inputs:

Contingency table: Square contingency, Mean square contingency, Coefficient of mean square contingency, Tschuprow's coefficient of contingency.

Co-curricular activities (15Hrs.)

Seminar or quiz or assignment or applications of Probability Theory and Distributions two real life problem or problem solving.

(Important Note: The external examination paper setter should not set the questions from

Additional Inputs)

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.JaganmohanRao, 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.

Practical 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.

Signed and approved by

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COURSE-III
CBCS/ SEMESTER SYSTEM
(w.e.f. 2022-23)
B.A./B.Sc. STATISTICS
STATISTICAL INFERENCE

Course Outcomes:

After successful completion of this course, student will be

- Learn standard sampling distributions like Chi Square, t and F and their characteristics and applications
- Know different techniques of point estimation for estimating the parameter values of population and interval estimation for population parameters.
- Get the knowledge of 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

Credits = 5 (theory 4+ practical 1)

Course Syllabus:

Module -I (12 Hrs.)

Concepts: Population, Sample, Parameter, statistic, Sampling distribution, Standard error. convergence in probability and convergence in distribution, law of large numbers, central limit theorem (statements only). Student's t- distribution, F – Distribution, χ^2 -Distribution: Definitions, properties and their applications.

Module -II (12 Hrs.)

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 for mean and variance in Normal Distribution

Module -III (12 Hrs.)

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.

Module- IV (12 Hrs.)

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 mean sand paired t-test. Chi-square test for goodness of fit and independence of attributes. F-test for equality of variances.

Module-V (12 Hrs.)

Non-parametric tests- their advantages and disadvantages, comparison with parametric tests. Measurement scale- nominal, ordinal, interval and ratio. One sample runs test, sign test and Wilcoxon-signed rank tests (single and paired samples). Two independent sample tests: Median test, Wilcoxon –Mann-Whitney U test, Wald Wolfowitz's runs test. Sign test for large sample case

Co-curricular activities (15Hrs.)

Seminar or quiz or assignment or applications of Statistical Inference two real life problem or problem solving.

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 :HoelP.G.
4. Hogg Tanis Rao: Probability and Statistical Inference. 7thedition.Pearson.

Practical - Paper –III

1. Large sample test for single mean
2. Large sample test for single Proportion
3. Large sample test for difference of proportions
4. Large sample test for correlation coefficient
5. Small sample test for single mean
6. Paired t-test(paired samples).
7. Small sample test for single variance(χ^2 - test)
8. χ^2 - test for goodness of fit and independence of attributes
9. Nonparametric tests for related samples (sign test and Wilcoxon signed rank test)
10. Nonparametric tests for two independent samples (Median test, Wilcoxon – Mann- Whitney - U test, Wald - Wolfowitz' s runs test)
11. Fitting of straight line by the method of least squares
12. Fitting of power curve of the type by the method of least squares.
13. Computation of correlation coefficient and regression lines for ungrouped data

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.

Signed and approved by

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Subject Expert
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Subject Expert
(from outside the parent
university)



Dr. V. Rohini Kumari
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university)

Dr. V. S. KRISHNA GOVT.DEGREE COLLEGE (A), VISAKHAPATNAM.

COURSE-IV

CBCS/ SEMESTER SYSTEM

(w.e.f. 2022-23)

B.A./B.Sc. STATISTICS

SAMPLING TECHNIQUES AND DESIGN OF EXPERIMENTS

Course Outcomes:

After successful completion of this course, student will be

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

Credits = 6 (theory 4+ practical 2)

Course Syllabus:

Module I (12 Hrs.)

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, determination of sample size, simple random sampling of attributes.

Module II (12 Hrs.)

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.

Module III (12 Hrs.)

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).

Module IV (12 Hrs.)

Randomized Block Design (R.B.D) and Latin Square Design (L.S.D) with their layouts and analysis, Missing plot techniques in RBD and LSD. Efficiency RBD over CRD, Efficiency of LSD over RBD and CRD.

Module V (12 Hrs.)

Factorial experiments – Main effects and interaction effects of 2^2 and 2^3 factorial experiments and their Statistical analysis. Yates procedure to find factorial effect totals.

Co-curricular activities (15Hrs.)

Seminar or quiz or assignment or applications of Sampling Techniques and Design of Experiments two real life problem or problem solving.

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.

Practical - Paper –IV

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 Comparison of relative efficiency of CRD with RBD
8. Estimation of single missing observation in RBD and its analysis
9. Analysis of LSD and efficiency of LSD over CRD and RBD
10. Estimation of single missing observation in LSD and its analysis
11. Analysis of 2^2 with RBD layout
12. Analysis of 2^3 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.

Signed and approved by

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COURSE-V
CBCS/ SEMESTER SYSTEM
(w.e.f. 2022-23)
B.A./B.Sc. STATISTICS
APPLIED STATISTICS

Course Outcomes:

After successful completion of this course, student will be

- Get the knowledge of time series.
- Basic idea of seasonal component, growth curves.
- Get the knowledge of Index Numbers.
- Understand the vital statistics.

Credits = 5 (theory 4+ practical 1)

Course Syllabus

Module I (12 Hrs.)

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.

Module II (12 Hrs.)

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

Module III (12 Hrs.)

Growth curves: Modified exponential curve, Logistic curve and Grompertz curve, fitting of growth curves by the method of three selected points and partial sums. De trending. Effect of elimination of trend on other components of the time series

Module IV (12 Hrs.)

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

Additional Inputs: wholesale price index number.

Module V (12 Hrs.)

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.

(Important Note: The external examination paper setter should not set the questions from **Additional Inputs**)

Co-curricular activities (15Hrs.)

Seminar or quiz or assignment or applications of Applied Statistics two real life problem or problem solving.

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.PapaiahSastry

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

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.

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COURSE-VI-A
CBCS/ SEMESTER SYSTEM
(w.e.f. 2022-23)
B.A./B.Sc. STATISTICS
Course VI-A: OPERATIONS RESEARCH - I

Course Outcomes:

After learning this course, the student will be

- To know the scope of Operations Research
- To link the OR techniques with business environment and life sciences
- To convert real life problems into mathematical models
- To find a solution to the problem in different cases
- To inculcate logical thinking to find a solution to the problem

Module -I (12 Hrs.)

Operations Research: Introduction to O.R. Origin and development of OR, Nature and features of O.R, Meaning, Definition of O.R, Scope of O.R, Phases of O.R, Advantages and Disadvantages of O.R, Convex sets and their properties. Linear Programming Problems: Definitions of LPP, Components, basic assumptions, Formulation of LPP, Solutions of LPP by Graphical method, Some exceptional cases in graphical method, Alternative Optima, Unbounded solution and Infeasible solution

Module -II (12 Hrs.)

Linear programming problem-: General LPP, Objective function, Constraints, Non-negative restrictions, Solutions of LPP, Basic definitions, Fundamental theorem of LPP, the computational procedure of Simplex algorithm and problems. Artificial Variable Technique- The Big-M Method or Method of Penalties, Two Phase Simplex method.

Module -III (12 Hrs.)

Transportation Problem: Definition of transportation problem, TPP as a special case of LPP, General Mathematical Transportation of LPP, Transportation table, feasible solutions by North-West corner, Matrix minimum and VAM methods and problems. test for optimum, closed loop in transportation table and its properties optimal solution through the MODI (U-V) method and stepping stone method for balanced and unbalanced.

Module -IV (12 Hrs.)

Assignment problem: Formulation and description of Assignment problem and its Variations. Unbalanced assignment problem, traveling salesman problem, Hungarian method for optimal solution.

Module -V (12 Hrs.)

Sequencing problem: Introduction, Definitions, assumptions, processing of n jobs through two machines, optimal sequence algorithm, processing of n jobs through three machines.

Co-curricular activities (15Hrs.)

Seminar or quiz or assignment or applications of Operations Research-I two real life problem or problem solving.

Reference Books:

1. S.D. Sharma, Operations Research, Kedar Nath Ram Nath & Co, Meerut.
2. Kanti Swarup, P.K.Gupta, Manmohn, Operations Research, Sultan Chand and sons, New Delhi.
3. J.K. Sharma, Operations Research and Application, Mc.Millan and Company, New Delhi.
4. Gass S.I : Linear Programming. Mc Graw Hill.
5. Hadly G : Linear programming. Addison-Wesley.
6. Taha H.M: Operations Research: An Introduction : Mac Millan.

Practical Paper –VI.A

1. Solving LPP by Graphical method
2. Solving the TP by NWCR, Matrix Minimum and VAM methods
3. Game theory-obtaining saddle point and pure, mixed strategies
4. Finding solution for Hungarian Method
5. Optimal solution for Assignment problem
6. Solving sequencing problem for jobs on two machines.

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COURSE-VII-A
CBCS/ SEMESTER SYSTEM
(w.e.f. 2022-23)
B.A./B.Sc. STATISTICS
OPERATIONS RESEARCH - II

Course Outcomes:

After learning this course, the student will be

- To solve the problems in logistics
- To find a solution for the problems having space constraints
- To minimize the total elapsed time in an industry by efficient allocation of jobs to the suitable persons.
- To find a solution for an adequate usage of human resources
- To find the most plausible solutions in industries and agriculture when a random environment exists.

Module -I (12 Hrs.)

Game and strategies:

Introduction, Two person zero sum game, Saddle point, Dominance property, 2xn, mx2 games- Graphical method.

Module -II (12 Hrs.)

Inventory control-I

Types of inventories, Cost of inventories, Factors effecting inventory control, Concept of EOQ, Deterministic inventory models.

Module -III (12 Hrs.)

Inventory control-II

Problems on EOQ with one price & more than one price break, Simple problems, probabilistic inventory model, Instantaneous demand, No setup cost model, Newspaper boy problem

Module -IV (12 Hrs.)

Network scheduling-I

PERT, CPM, Logical sequencing, Rules for network construction, Critical path analysis, Floats and slack times.

Module -V (12 Hrs.)

Network scheduling-II

Probability considerations in PERT, Distinction between PERT and CPM, applications of network techniques, Limitations and difficulties in using Network, Project Cost, time Cost optimization algorithm and problems based on it

Co-curricular activities (15Hrs.)

Seminar or quiz or assignment or applications of Operations Research-II two real life problem or problem solving.

Reference Books:

1. S.D. Sharma, Operations Research, Kedar Nath Ram Nath & Co, Meerut.
2. Kanti Swarup, P.K.Gupta, Manmohn, Operations Research, Sultan Chand and sons, New Delhi.
3. J.K. Sharma, Operations Research and Application, Mc.Millan and Company, New Delhi.
4. Gass: Linear Programming. Mc Graw Hill.
5. Hadly : Linrar programming. Addison-Wesley.
6. Taha : Operations Research: An Introduction : Mac Millan.
7. Dr.NVS Raju; Operations Research, SMS education,

Practical Paper –VII.A

1. Solving game theory
2. Game theory-2
3. Game theory-obtaining saddle point
4. Finding solution for Inventory control
5. Optimal solution for Network scheduling
6. Solving Network scheduling

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COURSE-VI-B
CBCS/ SEMESTER SYSTEM
(w.e.f. 2022-23)
B.A./B.Sc. STATISTICS
Statistical Process and Quality Control

Course Outcomes:

After learning this course, the student will be

- To define 'quality' in a scientific way
- To differentiate between process control and product control
- To speak about quality awareness in industry
- To pave a path to an industry to meet the standards
- To effectively implement various plans to control the quality standards at various stages of an industry.

Module I (12 Hrs.)

Statistical Techniques in Quality control: Meaning of quality, concept of total quality management (TQM) and six-sigma, ISO, comparison between TQM and Six Sigma, Meaning and purpose of Statistical Quality Control (SQC), Seven Process Control Tools of Statistical Quality Control (SQC) (i) Histogram (ii) Check Sheet, (iii) Pareto Diagram (iv) Cause and effect diagram (CED), (v) Defect concentration diagram (vi) Scatter Diagram (vii) Control chart. (Only introduction of 7 tools is expected).

Module II (12 Hrs.)

Control charts: Statistical basis of Shewhart control charts, use of control charts. Interpretation of control charts, Control limits, Natural tolerance limits and specification limits. Chance causes and assignable causes of variation, justification for the use of 3-sigma limits for normal distribution, Criteria for detecting lack of control situations:

- (i) At least one point outside the control limits
- (ii) A run of seven or more points above or below central line.

Module III (12 Hrs.)

Control charts for Variables: Introduction and Construction of $\bar{X}$ and R chart and Standard Deviation Chart when standards are specified and unspecified, corrective action if the process is out of statistical control.

Control charts for Attributes: Introduction and Construction of p chart, np chart, C Chart and U charts when standards are specified and unspecified, corrective action if the process is out of statistical control.

Module IV (12 Hrs.)

Acceptance Sampling for Attributes: Introduction, Concept of sampling inspection plan, Comparison between 100% inspection and sampling inspection. Procedures of acceptance sampling with rectification, Single sampling plan and double sampling plan. Producer's risk and Consumer's risk, Operating characteristic (OC) curve, Acceptable Quality Level (AQL), Lot Tolerance Fraction Defective (LTFD) and Lot Tolerance Percent Defective (LTPD), Average Outgoing Quality (AOQ) and Average Outgoing Quality Limit (AOQL), AOQ curve, Average Sample Number (ASN), Average Total Inspection (ATI).

Module V (12 Hrs.)

Single Sampling Plans: Computation of probability of acceptance using Binomial and Poisson approximation, of AOQ and ATI. Graphical determination of AOQL, Determination of a single sampling plan by: a) lot quality approach b) average quality approach.

Double Sampling Plan: Evaluation of probability of acceptance using Poisson distribution, Structure of OC Curve, Derivation of AOQ, ASN and ATI (with complete inspection of second sample), Graphical determination of AOQL, Comparison of single sampling plan and double sample plan.

Co-curricular activities (15Hrs.)

Seminar or quiz or assignment or applications of Statistical Process and Quality Control two real life problem or problem solving.

Text Books:

1. Montgomery, D. C. (2008): Statistical Quality Control, 6thEdn., John Wiley, New York.
2. Parimal Mukhopadhyay: Applied Statistics, New Central Book Agency.
3. Goon A.M., Gupta M.K. and Das Gupta B. (1986): Fundamentals of Statistics, Vol. II, World Press, Calcutta.
4. S.C. Gupta and V.K. Kapoor: Fundamentals of Applied Statistics – Chand publications.

References Books:

1. R.C. Gupta: Statistical Quality Control.
2. Duncan A.J. (1974): Quality Control and Industrial Statistics, fourth edition D.B. Taraporewala Sons and Co. Pvt. Ltd., Mumbai.
3. Grant, E. L. and Leavenworth (1980): Statistical Quality Control, fifth edition, Mc-Graw Hill, New Delhi.

Practical Paper –VI. B

1. Construction of $\bar{X}$ and R Charts.
2. Construction of $\bar{X}$ and σ Charts.
3. Construction of p Charts for fixed sample size.
4. Construction of p Charts for variable sample size.
5. Construction of np Charts.
6. Construction of C charts.
7. Construction of U charts.
8. Single sampling plan for attributes (OC Curve, Producer's and Consumer's risks, AOQ, AOQL, ATI).
9. Determination of single sampling plan by: a) lot quality approach b) average quality approach.
10. Double sampling plan for attributes (OC curve, AOQ, AOQL, ATI, ASN using Poisson distribution).

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COURSE-VII-B
CBCS/ SEMESTER SYSTEM
(w.e.f. 2022-23)
B.A./B.Sc. STATISTICS
DEMOGRAPHY & VITAL STATISTICS

Course Outcomes:

After learning this course, the student will be

- learn the concept related population studies.
- know the applications of demography in different fields.

Module -I (12 Hrs.)

Population Theories: Converge and Content errors in demographic data, use of balancing equations and Chandra Sekharan-Deming formula to check completeness of registration date. Introduction and Sources of collecting data on Vital Statistics, errors in Census and registration data.

Module -II (12 Hrs.)

Measurement of Mortality: Crude Death Rate (CDR), Specific death rate (SDR), Infant mortality, Rate (IMR) and Standardized death rates. Adjustment of age data, Use of Myer and UN indices, Population Composition, dependency ratio.

Module -III (12 Hrs.)

Life tables: Stationary and Stable population, Central Mortality Rates and Force of Mortality, Life (Mortality) tables, Assumption, Description, Construction of life tables and use of life tables.

Module -IV (12 Hrs.)

Abridged life tables: Concept and construction of abridged life tables by Eed-Merrell method, Gereville's method and King's method, Measurement of Fertility, Crude Birth Rate (CBR), General Fertility Rate (GFR), Specific Fertility Rate(SFR) and Total Fertility Rate(TFR).

Module -V (12 Hrs.)

Reproduction Rates: Measurement of population growth, crude rate of natural increase, Pearl's Vital index, Gross reproductive rate (GRR) and Net reproductive rate (NRR).

Co-curricular activities (15Hrs.)

Seminar or quiz or assignment or applications of Demography & Vital Statistics two real life problem or problem solving.

Text Books:

1. Mukhopadhyaya. P (1999) Applied Statistics, Books and Allied(P) Ltd
2. Goon, A.M, Gupta M.K and Dasgupta, B.(2008) : Fundamentals of Statistics, Vol11, 9th edition, World Press.
3. Biswas. S(1998), Stochastic Process in Demography & Application, Wiley Eastern Ltd.
4. K.Srinivas Basic demographic techniques & application

Practical Paper –VII.B

1. Practical problem I
2. Practical problem II
3. Practical problem III
4. Practical problem IV
5. Practical problem V
6. Practical problem VI
7. Practical problem VII
8. Practical problem VIII

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COURSE-VI-C

CBCS/ SEMESTER SYSTEM

(w.e.f. 2022-23)

B.A./B.Sc. STATISTICS

FORECASTING METHODS

Outcomes: After completion of this paper the student able to learn the concept related time series and also know the applications of time series in different fields and also learn forecasting methods

Module -I (12 Hrs.)

Smoothing Methods: Averaging methods, Exponential Smoothing methods, a Comparison of methods, general aspects of smoothing methods

Module -II (12 Hrs.)

Decomposition methods: Trend fitting, the ratio to moving averages classical decomposition method. Different types of moving averages

Module -III (12 Hrs.)

Modes for time Series data: Auto-covariance and auto correlation functions, stationary process, white noise process, moving averages (MA) process, Auto Regressive (AR)process, Auto regressive and Moving Average (ARMA)Process, Auto Regressive Integrated and Moving Average (ARIMA) Process.

Module -IV (12 Hrs.)

BOX-Jennings Models: Identification, Estimation and diagnostic checking for the models, Simulation and Monte Carlo Methods.

Module -V (12 Hrs.)

Application of Time –Series Analysis: Determining randomness of data, Examining stationary of a time series, removing non- stationary in a time series, recognizing seasonality in a Time series

Co-curricular activities (15Hrs.)

Seminar or quiz or assignment or applications of Forecasting Methods
two real life problem or problem solving.

Text Books-Reference Books:

1. Fundamentals of Applied Statistics: VK Kapoor and SC Gupta
2. BOX, GEP and Jenkins, G.M(1976), Time series Analysis –Forecasting and Control, Holden-dav, San Francisco
3. Forecasting Methods by Makridakis
4. Montgomery, DC and Johnsion L.A(1977) Forecasting and Time Series Analysis

Practical's-VI-C

1. Averaging method
2. Measurement of Exponential Smoothing methods
3. Decomposition methods
4. Auto Regressive (AR) process
5. Auto Regressive Integrated and Moving Average (ARIMA) Process.
6. Auto regressive and Moving Average (ARMA) Process.
7. Monte Carlo Method

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COURSE-VII-C
CBCS/ SEMESTER SYSTEM
(w.e.f. 2022-23)
B.A./B.Sc. STATISTICS
ADVANCED EXPERIMENTAL DESIGNS

Outcomes: After successful completion of this course, student will be

- Difference between CRD, RBD and LSD.
- an idea about missing plot in RBD and LSD techniques.
- carry out one way and two-way Analysis of covariance,
- use appropriate experimental designs to analyze the experimental data
- understand the concept of BIBD and PBIBD

Module -I (12 Hrs.)

Experimental Design: Review of Completely Randomized design (C.R.D), Randomized block design (R.B.D) and Latin square design (L.S.D.).

Module -II (12 Hrs.)

Missing Plot technique: Analysis of Randomized Block Design (R.B.D) with one and two missing observations and Latin Square Design (L.S.D) with one missing observation.

Module -III (12 Hrs.)

Analysis of Covariance (ANCOVA): Analysis of covariance for a one-way classification with one concomitant variable in C.R.D. Layout and for two-way classification with one concomitant variable in R.B.D.

Module -IV (12 Hrs.)

Factorial Design: Estimation of main effects, interactions and analysis of 2^2 , 2^3 and 3^2 factorial experiments.

Module V (12 Hrs.)

Balanced Incomplete Block design (BIBD) and Partially Incomplete block design (PBIBD).

Co-curricular activities (15Hrs.)

Seminar or quiz or assignment or applications of Advanced Experimental Designs two real life problem or problem solving.

Text Books:

1. S.C. Gupta and V.K.Kapoor, Fundamentals of Applied Statistics, Sultan Chand and Sons.
2. Das, M.N. and N.C.Giri, Design and Analysis of Experiments, 2nd edition, New Age International (P) Limite Publishers, 1986.
3. Montgomery, D.C: Design of Analysis of Experiments, John Wiley

Practical's VII-C

1. Analysis of CRD and RBD with missing observation
2. Analysis of CRD and RBD with missing observation using MS Excel or using Stat disk.
3. Analysis of LSD with missing observation
4. Analysis of LSD with missing observation using MS Excel
5. Analysis for covariance for a one-way classification with one concomitant variable in C.R.D
6. Analysis for covariance for a one-way classification with one concomitant variable in R.B.D.

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Recommended Question Paper Patterns and Models
BLUE PRINT FOR QUESTION PAPER PATTERN

COURSE-I DESCRIPTIVE STATISTICS

Module	TOPIC	S.A.Q(including choice)	E.Q(including choice)	Total Marks
I	Introduction to statistics	2	2	30
II	Measures of dispersion	2	2	30
III	Introduction to probability	1	2	25
IV	Random variable	2	2	30
V	Mathematical expectation	1	2	25
TOTAL		8	10	140

S. A. Q = Short answer questions (5 marks), **E.Q.** = Essay questions (10 marks)

Short answer questions : 5 X 5 M = 25 M , Essay questions: 5 X 10 M = 50 M

Total Marks

.....
= 75 M
.....

Weightage for each level of Bloom's Taxonomy

Knowledge Question	Definition and explanation type	10 marks
Understanding Question	Describe type	5 marks
Analysis and Application Question	Problem solving type/ Theorem proof type	50 marks
critical thinking question	Problem solving type	10 marks

Dr. V. S. KRISHNA GOVT. DEGREE COLLEGE (A), VISAKHAPATNAM
COURSE I
CBCS / SEMESTER SYSTEM
(w.e.f. 2022-23)
B.A./B.Sc. STATISTICS
DESCRIPTIVE STATISTICS
MODEL QUESTION PAPER

Time: 3Hrs

Max.Marks:75M

Section A

Answer any **FIVE** questions. Each question **FIVE** marks (5 X 5 = 25)

1. Explain Geometric and Harmonic mean for discrete and continues data.
2. State and prove Additional theorem of probability.
3. What is Skewness and Kurtosis.
4. Define Bivariate random variable, joint and marginal distribution functions .
5. Define random variable, probability mass function and probability density function.
6. Define
 - i. Trail
 - ii. Mutually exclusive event
 - iii. Sample space
 - iv. Conditional probability
7. Write the merits of Graphs and explain any two Graphs.
8. What are the Properties of Expectation, variance and covariance.

Section B

Answer **ALL** questions. Each question **TEN** marks (5 X 10 = 50)

9. (a) Explain importance of statistics and any two statistical organizations in India.

(OR)

- (b) Write the merits and demerits of the Arithmetic Mean and
Calculate the mean for the following frequency distribution

Class intervals	0-8	8-16	16-24	24-32	32-40	40-48
f	8	7	16	24	15	7

10. (a) Calculate Quartile deviation and Mean deviation from mean, for the following

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of Students	6	5	8	15	7	6	3

(OR)

(b) Explain skewness and kurtosis.

11. (a) State and prove Baye's theorem.

(OR)

(b) State and prove multiplication theorem of probability for 2 and independent events.

12. (a) A random variable X has the following probability function

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

(i) Find k,

(ii) Evaluate $P(X < 6)$, $P(X \geq 6)$ and $P(0 < X < 5)$

(OR)

(b) Explain discrete and continuous random variables with examples.

13. (a) State and prove additional theorem of mathematical expectation for n events

(OR)

(b) State and prove Chebychev's inequality.

Recommended Question Paper Patterns and Models
BLUE PRINT FOR QUESTION PAPER PATTERN

COURSE-II PROBABILITY THEORY AND DISTRIBUTIONS

Module	TOPIC	S.A.Q(including choice)	E.Q(including choice)	Total Marks
I	Discrete distribution	2	2	30
II	Continuous distribution	2	2	30
III	Correlation	1	2	25
IV	Regression	2	2	30
V	Curve fitting	1	2	25
TOTAL		8	10	140

S. A. Q = Short answer questions (5 marks), **E.Q.** = Essay questions (10 marks)

Short answer questions : 5 X 5 M = 25 M , Essay questions : 5 X 10 M = 50 M

Total Marks = 75 M

Weightage for each level of Bloom's Taxonomy

Knowledge Question	Definition and explanation type	10 marks
Understanding Question	Describe type	5 marks
Analysis and Application Question	Problem solving type/ Theorem proof type	50 marks
critical thinking question	Problem solving type	10 marks

Dr. V. S. KRISHNA GOVT. DEGREE COLLEGE (A), VISAKHAPATNAM
COURSE II
CBCS / SEMESTER SYSTEM
(w.e.f. 2022-23)
B.A./B.Sc. STATISTICS
PROBABILITY THEORY AND DISTRIBUTIONS
MODEL QUESTION PAPER

Time: 3Hrs

Max.Marks:75M

Section A

Answer any **FIVE** questions. Each question **FIVE** marks (5 X 5 = 25)

1. Briefly explain Discrete and Continuous distributions.
2. Derive mean and variance for Binomial distribution.
3. Derive variance for Exponential and Rectangular distributions.
4. What is principle of least square and fitting of a straight line.
5. What correlation and explain types of correlation with examples.
6. Difference between correlation and regression.
7. Derive relation between class frequencies.
8. Explain Exponential curve.

Section B

Answer **ALL** questions. Each question **TEN** marks (5 X 10 = 50)

9. (a) Define Poisson distribution and give any four applications of Poisson distribution. Derive MGF, CGF, PGF and CF for Poisson distribution.
(OR)

(b) Fit a geometric distribution to the following data.

X	0	1	2	3	4	5	6
f	120	48	20	7	3	1	1

10. (a) Define Normal distribution and Standard Normal distribution. Write any five properties of normal distribution and write coefficient of Skewness, Kurtosis.

(OR)

- (b) Define Exponential distribution and drive lack of memory property of Exponential distribution.

11. (a) Define fitting of a second degree parabola and also fit a second degree parabola to the following data.

X	0	1	2	3	6
Y	1	1.8	1.3	2.5	6.3

(OR)

- (b) Fit a power curve of the form $y=ax^b$ to the following data

X	1	2	3	4	5	6
Y	1200	900	600	200	110	50

12. (a) Obtain the regression lines of Y on X and X on Y. Estimate the value of Y if X=65

X	56	42	72	36	63	47	55	49	38	42	62	60
Y	147	125	165	118	149	128	150	145	115	132	152	160

(OR)

- (b) Explain scatter diagram of correlation coefficient and find out correlation coefficient to the following data.

X	10	15	12	17	13	16	24	14	22	20
y	30	42	45	46	33	34	40	35	39	38

13. (a) Define consistency of data and also derive conditions for consistency of data.

(OR)

- (b) Given the following set of frequencies, find out all the remaining class frequencies. N= 23713, (A)= 1618, (B)= 2015, (C)= 770, (AB)= 587, (AC)= 335, (BC)= 428 and (ABC)= 156

Recommended Question Paper Patterns and Models

BLUE PRINT FOR QUESTION PAPER PATTERN

COURSE-III STATISTICAL INFERENCE

Module	TOPIC	S.A.Q(including choice)	E.Q(including choice)	Total Marks
I	Distributions	2	2	30
II	Theory of estimation	2	2	30
III	Testing of hypothesis	1	2	25
IV	Large and small sample tests	2	2	30
V	Non parametric tests	1	2	25
TOTAL		8	10	140

S. A. Q = Short answer questions (5 marks) , **E.Q.** = Essay questions (10 marks)

Short answer questions : 5 X 5 M = 25 M

Essay questions : 5 X 10 M = 50 M

Total Marks = = 75 M

Weightage for each level of Bloom's Taxonomy

Knowledge Question	Definition and explanation type	10 marks
Understanding Question	Describe type	5 marks
Analysis and Application Question	Problem solving type/ Theorem proof type	50 marks
critical thinking question	Problem solving type	10 marks

Dr. V. S. KRISHNA GOVT. DEGREE COLLEGE (A), VISAKHAPATNAM
COURSE III
CBCS / SEMESTER SYSTEM
(w.e.f. 2022-23)
B.A./B.Sc. STATISTICS
STATISTICAL INFERENCE
MODEL QUESTION PAPER

Time: 3Hrs

Max.Marks:75M

Section A

Answer any **FIVE** questions. Each question **FIVE** marks (5 X 5 = 25)

1. Define
 - i. Sample
 - ii. Central Limit theorem
 - iii. Standard error
 - iv. Parameter
2. What is Exact sampling distribution and Explain types of Exact sampling distribution.
3. What is Maximum Likelihood Estimator and write regularity conditions.
4. What is good estimator and define its characteristics.
5. What is type I and type II errors.
6. Define Null hypothesis, Alternative, power test and level of significance.
7. Explain chi-square test for goodness of fit.
8. Define best critical region.

Section B

Answer **ALL** questions. Each question **TEN** marks (5 X 10 = 50)

9. (a) Derive the p.d.f. of chi-square distribution.
(OR)
(b) Define F-distribution and students t-distribution and write its applications.
10. (a) Prove that the sample mean is an unbiased estimator of population mean and sample variance is not an unbiased estimator of the population variance.
(OR)
(b) State and prove Cramer-Rao inequality.
11. (a) State and prove Neyman-Pearson's lemma.
(OR)
(b) Obtain the best critical region for testing $H_0 : \lambda = \lambda_0$ against $H_1 : \lambda = \lambda_1$ in Poisson distribution.

12. (a) Explain test for single proportion and difference of proportions.

(OR)

(b) The mean and S.D. from a sample of size 400 are 250 and 40 respectively. Those of another sample of size 400 are 220 and 55. Test at 1 % level of significance whether the means of the two populations from which the samples have been drawn are equal.

13. (a) Explain Wald-Wolfowitz run test for two samples.

(OR)

(b) Explain two sample Median test and Mann-Whitney U-test.

Recommended Question Paper Patterns and Models

BLUE PRINT FOR QUESTION PAPER PATTERN

COURSE-IV SAMPLING TECHNIQUES AND DESIGN OF EXPERIMENTS

Module	TOPIC	S.A.Q(including choice)	E.Q(including choice)	Total Marks
I	Simple random sampling	2	2	30
II	Stratified random and systematic sampling	2	2	30
III	Analysis of variance	1	2	25
IV	RBD,LSD &CRD	2	2	30
V	Factorial experiments	1	2	25
TOTAL		8	10	140

S. A. Q = Short answer questions (5 marks), **E.Q.** = Essay questions (10 marks)

Short answer questions: 5 X 5 M = 25 M , Essay questions : 5 X 10 M = 50 M

Total Marks =
= 75 M
.....

Weightage for each level of Bloom's Taxonomy

Knowledge Question	Definition and explanation type	10 marks
Understanding Question	Describe type	5 marks
Analysis and Application Question	Problem solving type/ Theorem proof type	50 marks
critical thinking question	Problem solving type	10 marks

Dr. V. S. KRISHNA GOVT. DEGREE COLLEGE (A), VISAKHAPATNAM
COURSE IV
CBCS / SEMESTER SYSTEM
(w.e.f. 2022-23)
B.A./B.Sc. STATISTICS

SAMPLING TECHNIQUES AND DESIGN OF EXPERIMENTS
MODEL QUESTION PAPER

Time: 3Hrs

Max.Marks:75M

Section A

Answer any **FIVE** questions. Each question **FIVE** marks (5 X 5 = 25)

1. Explain types of sampling.
2. Define Sampling and non-sampling errors
3. What are the Advantages and disadvantages of stratified sampling.
4. Derive the relation between proportional allocation and SRS.
5. Explain Yates procedure in factorial experiment.
6. Define Analysis of variance and its assumptions.
7. Explain CRD and RBD with ANOVA Table.
8. Explain Three Principles of Experimental Design.

Section B

Answer **ALL** questions. Each question **TEN** marks (5 X 10 = 50)

9. (a) Derive the variance of the sample mean in SRSWOR, $Var(\bar{y}_n) = \left(\frac{1}{n} - \frac{1}{N}\right) S^2$.
(OR)

(b) Explain Simple Random Sampling and Methods of selecting SRS.

10. (a) What is Stratified Random Sampling and explain Stratified Random Sampling with proportional, optimum allocations.

(OR)

(b) Prove that $Var(\bar{y}_{st}) \leq Var(\bar{y}_{sys}) \leq Var(\bar{y}_n)_R$

11. (a) Define ANOVA, write its assumptions and explain Two-way classification.

(OR)

(b) Explain ANOVA one-way classification and estimate the parameters by least Square.

12. **(a)** Explain Latin Square Design and write its advantages.

(OR)

(b) Explain missing value in RBD and write advantages of RBD.

13. **(a)** Explain 2^3 - factorial experiment.

(OR)

(b) Explain statistical analysis of 2^2 -design.

Recommended Question Paper Patterns and Models

BLUE PRINT FOR QUESTION PAPER PATTERN

COURSE-V: APPLIED STATISTICS

Module	TOPIC	S.A.Q(including choice)	E.Q(including choice)	Total Marks
I	Time series	2	2	30
II	Seasonal components	2	2	30
III	Growth curves	1	2	25
IV	Index numbers	2	2	30
V	Vital statistics	1	2	25
TOTAL		8	10	140

S. A. Q = Short answer questions (5 marks) **E.Q.** = Essay questions (10 marks)

Short answer questions : 5 X 5 M = 25 M, Essay questions : 5 X 10 M = 50 M

Total Marks = 75 M

Weightage for each level of Bloom's Taxonomy

Knowledge Question	Definition and explanation type	10 marks
Understanding Question	Describe type	5 marks
Analysis and Application Question	Problem solving type/ Theorem proof type	50 marks
critical thinking question	Problem solving type	10 marks

Dr. V. S. KRISHNA GOVT. DEGREE COLLEGE (A), VISAKHAPATNAM
COURSE V
CBCS / SEMESTER SYSTEM
(w.e.f. 2022-23)
B.A./B.Sc. STATISTICS
APPLIED STATISTICS
MODEL QUESTION PAPER

Time: 3Hrs

Max.Marks:75M

Section A

Answer any **FIVE** questions. Each question **FIVE** marks (5 X 5 = 25)

1. Explain Additive and Multiplication models for trend.
2. Explain method of moving average.
3. Explain any two measures of fertility.
4. Explain various methods in Vital statistics
5. Define Ratio, Rates and measurement of Population.
6. Uses of index numbers.
7. What is cost of living index number and explain its main construction steps.
8. Fit a straight line and second-degree parabola by least square.

Section B

Answer **ALL** questions. Each question **TEN** marks (5 X 10 = 50)

9. (a) Define Time series and components of time series.

(OR)

- (b) Explain graphical, semi average methods in trends.

10. (a) Explain simple average and ratio to trend methods in seasonal variation.

(OR)

- (b) Explain link relative and ratio to moving average methods in seasonal variation.

11. (a) Explain modified Exponential curve and fit a method of three selected points.

(OR)

- (b) Fit a Gompertz and Logistics curves.

12. (a) Explain the construction of index numbers with suitable formulas.

(OR)

- (b) Explain the criteria for a good index number.

13. (a) Explain measures of Mortality.

(OR)

- (b) Explain columns of Life table with suitable formulas and write its assumptions.

Recommended Question Paper Patterns and Models

BLUE PRINT FOR QUESTION PAPER PATTERN

COURSE-VIA: OPERATIONS RESEARCH-I

Module	TOPIC	S.A.Q(including choice)	E.Q(including choice)	Total Marks
I	Operations Research	2	2	30
II	Linear Programming Problem	2	2	30
III	Transportation Problem	1	2	25
IV	Assignment Problem	2	2	30
V	Sequencing Problem	1	2	25
TOTAL		8	10	140

S. A. Q = Short answer questions (5 marks)

E.Q. = Essay questions (10 marks)

Short answer questions : 5 X 5 M = 25 M

Essay questions : 5 X 10 M = 50 M

Total Marks = 75 M

Weightage for each level of Bloom's Taxonomy

Knowledge Question	Definition and explanation type	10 marks
Understanding Question	Describe type	5 marks
Analysis and Application Question	Problem solving type/ Theorem proof type	50 marks
critical thinking question	Problem solving type	10 marks

Dr. V. S. KRISHNA GOVT. DEGREE COLLEGE (A), VISAKHAPATNAM
COURSE VI.A
CBCS / SEMESTER SYSTEM
(w.e.f. 2022-23)
B.A./B.Sc. STATISTICS
OPERATIONS RESEARCH-I
MODEL QUESTION PAPER

Time: 3Hrs

Max.Marks:75M

Section A

Answer any **FIVE** questions. Each question **FIVE** marks (5 X 5 = 25)

1. Explain the formulation of LPP
2. Write advantages and disadvantages of O.R.
3. Explain General LPP
4. How do you obtain a sequence?
5. Explain Concept of Two –Phase Method.
6. Explain the slack and surplus Variables
7. Explain assignment problem as a special case of TP.
8. Explain the concept of Artificial Variable Technique

SECTION-B

Answer **ALL** questions. Each question **TEN** marks (5 X 10 = 50)

9. (a) Describe the Nature and Scope of O.R.

(OR)

- (b) Solve the Following LPP by using Graphical Method

Maximize $Z=45X_1+80X_2$

Subject to const: $5X_1 + 20X_2 \leq 400, 10X_1 + 15X_2 \leq 450, X_1, X_2 \geq 0$

10. (a) Use simplex Method to solve the following LPP

Maximize $Z=X_1-X_2+3X_3$

Subject to const: $X_1+X_2+X_3 \leq 10, 2X_1-X_3 \leq 2, 2X_1-2X_2+3X_3 \leq 0, X_1, X_2, X_3 \geq 0$

(OR)

- (b) Solve the Following LPP by using Big-M Method

Minimize $Z=2X_1+3X_2$

Subject to const: $X_1+X_2 \geq 5, X_1+2X_2 \geq 6, X_1, X_2 \geq 0$

11. (a) Explain North-West Corner Rule and Least Cost Entry Methods for a given TP

(OR)

- (b) Solve the following Transportation Problem by using VAM.

	D ₁	D ₂	D ₃	Supply
O ₁	50	30	220	1
O ₂	90	45	170	3
O ₃	400	200	50	5
Demand	5	2	2	9

12. (a) Solve the following assignment problem by using Hungarian method
Machines

	1	2	3	4
A	10	40	15	20
B	15	30	5	15
C	35	20	12	24
D	17	40	24	20

(OR)

- (b) Define and mathematical representation of a Assignment problem.

13. (a) Give an algorithm for n job-2 machines problem.

(OR)

- (b) There are five jobs, each of which is to be processed through three machines A, B, C in the order ABC. Processing times in hours are

Job	A	B	C
1	3	4	7
2	8	5	9
3	7	1	5
4	5	2	6
5	4	3	10

Recommended Question Paper Patterns and Models

BLUE PRINT FOR QUESTION PAPER PATTERN

COURSE-VII.A: OPERATIONS RESEARCH-II

Module	TOPIC	S.A.Q(including choice)	E.Q(including choice)	Total Marks
I	Game and strategies	2	2	30
II	Inventory control-I	2	2	30
III	Inventory control-II	1	2	25
IV	Network scheduling-I	2	2	30
V	Network scheduling-II	1	2	25
TOTAL		8	10	140

S. A. Q = Short answer questions (5 marks)

E.Q. = Essay questions (10 marks)

Short answer questions : 5 X 5 M = 25 M

Essay questions : 5 X 10 M = 50 M

Total Marks = 75 M

Weightage for each level of Bloom's Taxonomy

Knowledge Question	Definition and explanation type	10 marks
Understanding Question	Describe type	5 marks
Analysis and Application Question	Problem solving type/ Theorem proof type	50 marks
critical thinking question	Problem solving type	10 marks

Dr. V. S. KRISHNA GOVT. DEGREE COLLEGE (A), VISAKHAPATNAM
COURSE VII.A
CBCS / SEMESTER SYSTEM
(w.e.f. 2022-2023)
B.A./B.Sc. STATISTICS
OPERATIONS RESEARCH-II
MODEL QUESTION PAPER

Time: 3Hrs

Max.Marks:75M

Section A

Answer any **FIVE** questions. Each question **FIVE** marks (5 X 5 = 25)

1. Explain pure and mixed strategies.
2. Explain different types of inventories.
3. Explain the determination of EOQ with one price break.
4. Write about economic lot size with finite rate
5. Write basic steps in PERT technique
6. Write rules for drawing network diagram.
7. Explain Errors in networking
8. Explain newspaper boy problem

Section-B

Answer **ALL** questions. Each question **TEN** marks (5 X 10 = 50)

9. (a) Find optimal strategies for the games for which for the payoff matrices are given below also find the value of the game.

(OR)

- (b) Write procedure of graphical method to solve 2 X n games

10. (a) Define inventory and explain the cost associated with inventories

(OR)

- (b) Explain inventory model with demand rate uniform and replenishment rate infinite.

11. (a) Explain EOQ model with one price break.

(OR)

- b) Explain the probabilistic inventory model with instantaneous demand and no setup cost.

12. (a) Find the optimum time of completion of project, when the time of completion of each task is as follows :A < D,E ; B,D < F ; C<G ; B,G< H ; F,G < I.

Task	A	B	C	D	E	F	G	H	I
Time	23	8	20	16	24	18	19	4	10

(OR)

- (b) Explain different types of floats and their importance.

13. (a) Difference between PERT and CPM.

(OR)

(b) Draw the network diagram for the following data

Activity	1-2	1-3	1-4	2-5	3-6	3-7	4-6
Duration(hrs)	2	2	1	4	8	5	3

- i. Find a critical path and project duration
- ii. Calculate total float, Free float, independent float

Recommended Question Paper Patterns and Models

BLUE PRINT FOR QUESTION PAPER PATTERN

COURSE-VI.B: Statistical Process and Quality Control

Module	TOPIC	S.A.Q(including choice)	E.Q(including choice)	Total Marks
I	Statistical techniques in Quality control	2	2	30
II	Control charts	2	2	30
III	Control charts for Variables & Attributes	1	2	25
IV	Acceptance Sampling for Attributes	2	2	30
V	Single Sampling Plans	1	2	25
TOTAL		8	10	140

S. A. Q = Short answer questions (5 marks)

E.Q. = Essay questions (10 marks)

Short answer questions : 5 X 5 M = 25 M

Essay questions : 5 X 10 M = 50 M

Total Marks = 75 M

Weightage for each level of Bloom's Taxonomy

Knowledge Question	Definition and explanation type	10 marks
Understanding Question	Describe type	5 marks
Analysis and Application Question	Problem solving type/ Theorem proof type	50 marks
critical thinking question	Problem solving type	10 marks

Dr. V. S. KRISHNA GOVT. DEGREE COLLEGE (A), VISAKHAPATNAM
COURSE VI.B
CBCS / SEMESTER SYSTEM
(w.e.f. 2022-2023)
B.A./B.Sc. STATISTICS
STATISTICAL PROCESS AND QUALITY CONTROL

MODEL QUESTION PAPER

Time: 3Hrs

Max.Marks:75M

Section A

Answer any **FIVE** questions. Each question **FIVE** marks (5 X 5 = 25)

1. What is $3\text{-}\sigma$ limits.
2. What is cause of variation.
3. Uses of control charts.
4. Define R-chart.
5. Write basic steps in PERT technique
6. Write rules for drawing network diagram.
7. Explain Errors in networking
8. Explain newspaper boy problem

Section-B

Answer **ALL** questions. Each question **TEN** marks (5 X 10 = 50)

9. (a) Define SQC and its uses, limitations.
(OR)
(b) what are the seven quality control tools?
10. (a) Explain control charts, its uses and interpretation.
(OR)
(b) Define
 - i. Chance cause
 - ii. Assignable cause
 - iii. outlier
 - iv. Natural tolerance and specification limits
11. (a) Explain control chart for mean ($\bar{X} - \text{chart}$)
(OR)
(b) Explain P- chart for fixed sample size.
12. (a) Définitions of basic terms of accepting sampling.
(OR)
(b) Explain OC curve.
13. (a) Define single sampling plan and determine n and c of SSP.
(OR)
(b) Define double sampling plan and procedure of DSP.

Recommended Question Paper Patterns and Models

BLUE PRINT FOR QUESTION PAPER PATTERN

COURSE-VII.B: DEMOGRAPHY & VITAL STATISTICS

Module	TOPIC	S.A.Q(including choice)	E.Q(including choice)	Total Marks
I	Population theories	2	2	30
II	Measures of mortality	2	2	30
III	Life tables	1	2	25
IV	Abridged life tables	2	2	30
V	Reproduction Rates	1	2	25
TOTAL		8	10	140

S. A. Q = Short answer questions (5 marks)

E.Q. = Essay questions (10 marks)

Short answer questions : 5 X 5 M = 25 M

Essay questions : 5 X 10 M = 50 M

Total Marks = 75 M

Weightage for each level of Bloom's Taxonomy

Knowledge Question	Definition and explanation type	10 marks
Understanding Question	Describe type	5 marks
Analysis and Application Question	Problem solving type/ Theorem proof type	50 marks
critical thinking question	Problem solving type	10 marks

Dr. V. S. KRISHNA GOVT. DEGREE COLLEGE (A), VISAKHAPATNAM
COURSE VII.B
CBCS / SEMESTER SYSTEM
(w.e.f. 2022-23)
B.A./B.Sc. STATISTICS
DEMOGRAPHY & VITAL STATISTICS
MODEL QUESTION PAPER

Time: 3Hrs

Max.Marks:75M

Section A

Answer any **FIVE** questions. Each question **FIVE** marks (5 X 5 = 25)

1. What are the errors that occur in the census and registration data
2. Explain about population composition
3. Distinguish between Stationary and Stable population
4. Mention the uses of life tables
5. Explain abridged life tables
6. Explain Crude rate of natural increase
7. What are the uses of vital statistics
8. What are the assumptions of life table

Section-B

Answer **ALL** questions. Each question **TEN** marks (5 X 10 = 50)

9. (a) Derive the Chandra Sekharan-Deming Formula.
(OR)
(b) Explain the sources of collecting data in Vital Statistics
10. (a) Explain the Various Mortality Rates
(OR)
(b) Explain the Uses of Myer and UN indices
11. (a) Explain Central Mortality Rate, Force of Mortality and Life tables
(OR)
(b) Describe the Description and Construction of life tables
12. (a) Derive the method of Feer-Merrell.
(OR)
(b) Derive the method of Gravilles.
13. (a) Explain about the measurement of population growth
(OR)
(b) Explain Gross and net reproduction rate.

Recommended Question Paper Patterns and Models

BLUE PRINT FOR QUESTION PAPER PATTERN

COURSE-VI.C: FORECASTING METHODS

Module	TOPIC	S.A.Q(including choice)	E.Q(including choice)	Total Marks
I	Smoothing methods	2	2	30
II	Decomposition methods	2	2	30
III	Modes for time series data	1	2	25
IV	Box-Jennings methods	2	2	30
V	Applications of time series analysis	1	2	25
TOTAL		8	10	140

S. A. Q = Short answer questions (5 marks)

E.Q. = Essay questions (10 marks)

Short answer questions : 5 X 5 M = 25 M

Essay questions : 5 X 10 M = 50 M

Total Marks = 75 M

Weightage for each level of Bloom's Taxonomy

Knowledge Question	Definition and explanation type	10 marks
Understanding Question	Describe type	5 marks
Analysis and Application Question	Problem solving type/ Theorem proof type	50 marks
critical thinking question	Problem solving type	10 marks

Dr. V. S. KRISHNA GOVT. DEGREE COLLEGE (A), VISAKHAPATNAM
COURSE VI.C
CBCS / SEMESTER SYSTEM
(w.e.f. 2022-23)
B.A./B.Sc. STATISTICS
FORECASTING METHODS
MODEL QUESTION PAPER

Time: 3Hrs

Max.Marks:75M

SECTION-A

Answer any **FIVE** questions. Each question **FIVE** marks (5 X 5 = 25)

1. Explain Simulation Method
2. Explain Time series
3. Explain Stationary and non-Stationary methods
4. What are the sources of Smoothing methods
5. Explain White Noise process
6. Explain different types of moving averages method
7. Explain Decomposition Method
8. Explain Forecasting Methods

Section-B

Answer **ALL** questions. Each question **TEN** marks (5 X 10 = 50)

9. (a) Explain exponential smoothing method.

(OR)

- (b) Explain averaging smoothing Method.

10. (a) Explain ratio to trend Moving averages method.

(OR)

- (b) Explain different types of moving average. BOX-Jenkins model

11. (a) Explain AR and MV processes.

(OR)

- (b) Explain Auto correlation and Auto Covariance functions.

12. (a) Explain BOX-Jenkins model.

(OR)

- (b) Explain the identification and estimation of the Box-Jenkins models.

13. (a) Explain the procedure of Non-stationary in a time series

(OR)

- (b) Define uses of Forecasting methods.

Recommended Question Paper Patterns and Models

BLUE PRINT FOR QUESTION PAPER PATTERN

COURSE-VII.C: ADVANCED EXPERIMENTAL DESIGNS

Module	TOPIC	S.A.Q(including choice)	E.Q(including choice)	Total Marks
I	Experimental design	2	2	30
II	Missing plot techniques	2	2	30
III	Analysis of covariance	1	2	25
IV	Factorial design	2	2	30
V	Balanced incomplete design	1	2	25
TOTAL		8	10	140

S. A. Q = Short answer questions (5 marks)

E.Q. = Essay questions (10 marks)

Short answer questions : 5 X 5 M = 25 M
 Essay questions : 5 X 10 M = 50 M

Total Marks =
 = 75 M

Weightage for each level of Bloom's Taxonomy

Knowledge Question	Definition and explanation type	10 marks
Understanding Question	Describe type	5 marks
Analysis and Application Question	Problem solving type/ Theorem proof type	50 marks
critical thinking question	Problem solving type	10 marks

Dr. V. S. KRISHNA GOVT. DEGREE COLLEGE (A), VISAKHAPATNAM
COURSE VII.C
CBCS / SEMESTER SYSTEM
(w.e.f. 2022-23)
B.A./B.Sc. STATISTICS
ADVANCED EXPERIMENTAL DESIGNS
MODEL QUESTION PAPER

Time: 3Hrs

Max.Marks:75M

SECTION-A

Answer any **FIVE** questions. Each question **FIVE** marks

(5 X 5 = 25)

1. Give the Advantages of CRD
2. Write two Disadvantages of LSD
3. Explain missing Plot Techniques
4. Define ANCOVA
5. Define main effects of 2^3 Experiments
6. What is 3^2 Experiment?
7. Define the parameters in BIBD
8. Explain advanced experimental design

Section-B

Answer **ALL** questions. Each question **TEN** marks

(5 X 10 = 50)

9. (a) Explain the Analysis of CRD

(OR)

- (b) Explain the Analysis of RBD

10. (a) Explain the Missing plot Technique of RBD with two missing observations
(OR)
(b) Explain the Missing plot Technique of LSD with one missing observation.
11. (a) Explain the ANCOVA for CRD
(OR)
(b) Explain the ANCOVA for RBD
12. (a) Explain 2^2 -factorial experimental design.
(OR)
(b) Explain 2^n -factorial experimental design
13. (a) Explain the concept of BIBD
(OR)
(b) Explain briefly PBIBD

Signed and approved by

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28/9/2022
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