

**Government College (Autonomous)
Rajamahendravaram**

NAAC Accredited at 'A+' Grade



DEPARTMENT OF STATISTICS

B.Sc. (I, II,III,IV,V&VI) SEMESTERS

SYLLABUS & MODEL PAPERS

2022-2023

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GOVERNMENT COLLEGE (A) RAJAMAHENDRAVARAM

DEPARTMENT OF STATISTICS

Committee Constituted for Board of Studies Meeting for the year 2022-2023

Sl. No.	Name	Member
1	Sri.G.Moses Head, Dept of Statistics DNR College(Autonomous) Bhimavaram	University Nominee
2	Dr. D.V. Ramana Murthy Head, Dept of Statistics SKVT College Rajahmundry	Local Subject Expert
3	Sri M. Kodandaram LIC of India Rajahmundry	Industrial Nominee
4	Sri K. Ashok Lecturer in Statistics SRR & CVR College(A) Vijayawada	Subject Expert
5	D. Suneel Kumar Head, Dept of Computer Science Govt College(A) ,Rajahmundry	Member
6.	Mr. J. Naga Sriram Guest faculty in Statistics Govt college(A) Rajamahendravaram	Member
7.	Mr. Ch. Naresh Guest faculty in Statistics Govt College(A) Rajamahendravaram	Member
8.	Ms.K.Suneetha Guest faculty in Statistics Govt College(A) Rajamahendravaram	Member
9.	Student Members (i) Sk. Hafeez (ii)K Pavan Lokesh (iii) N Swarna Latha (iv) K Lavnya	

DEPARTMENT OF STATISTICS
Approved List of Examiners/ Paper Setters

Name of the Lecturer/Reader	College	Phone.N	Mail.id
Sri A. Anand, Lecturer	M.R.College, Vizianagaram		
Dr.C.S.S.R.L.H.Rao, Lecturer	M.R.College, Vizianagaram	9394066306	chraomr@gmail.com
Dr, P. KondaBabu, Lecturer	M.R.College, Vizianagaram	9491571046	kondababupuli@gmail.com
Sri G. Moses, Lecturer	D.N R College, Bhimavaram	9440185103	
Sri N. Srinivasa Rao, Lecturer	AndhraLoyolaCollege, Vijayawada		nunnasr@gmail.com
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Dr.KousarJahaBegum,Lecturer	Govt. College, Chittoor	9985312244	begum.kousar123@gmail.com
Sri T. Gandhi, Lecturer	Mrs.A.V.N.College,Visakhapatnam		
Sri V. Praveen, Lecturer	A.B.N. College, Kovvur	8184853368	
Grandhi Prasad, Lecturer	AdityaDegreecollege,Rajahmundry		
Dr.D.V.RamanaMurthy,Lecture	SKVT College, Rajahmundry	9949135864	dr.dvvmurthy@gmail.com
Sri K. Ashok, Lecturer	SRR&CVR College(A),Vijayawada	9848505506	sairamya285@gmail.com
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Dr.B.Venkata Ram, Lecturer	SSBN Degree College,Ananthapur	9440410474	gsd.atp@gmail.com
Dr. V.Munnaih, Lecturer	PVKN.GOV.T.College,Chitturu	924852594	drvmstats@gmail.com
Dr.N.Madhavi,Lecturer	GOVT.College(A),Rajahmundry	9951768491	madhavi.au@gmail.com
Dr.A.Kullaya swamy,Lecturer	S.G.College for Degree and PG	8019114632	swamy.anchal@gmail.com
Dr.R.V.S.Prasad,Lecturer	P.R.R.V.S GOVT college ,Vidava	9440493600	drvsvstatnlr@gmail.com
Dr.Devasena,Lecturer	S.S.B.N Degree college,Ananthpur	9441469927	gsd.atp@yahoo.com
Dr.D.V.L.N.Jogiraju,Lecturer	B.V.K.Degree College,Visakhaptanam	9440426883	Jogiraju76@gmail.com
Sri.CH.Naresh,Lecturer	GOVT.College(A),Rajahmundry	8297826683	nareshchitturi27@gmail.com
Sri.J.Naga Sriram,Lecturer	GOVT.College(A),Rajahmundry	7382499623	nagasriram.jonnala@gmail.com
K.Suneetha,lecturer	GOVT.College(A),Rajahmundry	7286038880	sunithakothuri7215@gmail.com
D.Madhulatha,Lecturer	S.K.V.T.College,Rajahmundry	7416179782	

Signatures

- 1.
- 2.
- 3.
- 4.

Chairman
Board of Studies

**GOVERNMENT COLLEGE (A) RAJAMAHENDRAVARAM
DEPARTMENT OF STATISTICS**

Consolidated Report of Board of Studies for the Year 2022-2023

A meeting was conducted for Board of Studies on 26-07-2021 from 12.00 to 01.00 for all the semesters under the chairmanship of Dr N.Madhavi (Lecturer-in-charge, Dept of Statistics) with the committee members.

The following members were present

Sl. No.	Name	Member	Signature
1	Sri.G.Moses Head, Dept of Statistics DNR College(Autonomous) Bhimavaram	University Nominee	
2	Dr. D.V. Ramana Murthy Head, Dept of Statistics SKVT College, Rajahmundry	Local Subject Expert	
3	Sri M. Kodandaram LIC of India, Rajahmundry	Industrial Nominee	
4	Sri K. Ashok Lecturer in Statistics SRR & CVR College(A), Vijayawada	Subject Expert	
5	D. Suneel Kumar Head, Dept of Computer Science Govt College(A) ,Rajahmundry	Member	
6.	Mr.J.NagaSriram Guest faculty in Statistics Govt college(A),Rajahmundry	Member	
7.	Mr. Ch. Naresh Guest faculty in Statistics Govt College(A),Rajahmundry	Member	
8.	Ms.K.Suneetha Guest faculty in Statistics Govt College(A),Rajahmundry	Member	
9.	Student Members (i) Sk.Hafeez (ii) K.Pavan Lokesh (iii) N.Swarna Latha (iv) K.Lavanya		

The following documents are submitted to the Academic Coordinator and Controller of Examinations

- 1. Syllabus of I, III and V Semesters.**
- 2. Model Question Papers of all the Semesters.**
- 3. List of Revised Examiners.**
- 4. Any other item with the permission of the chair.**

Signatures

- 1.
- 2.
- 3.
- 4.

**Chairman
Board of Studies**

DEPARTMENT OF STATISTICS

Minutes & Resolutions of BOS dated 26-07-2022

A meeting was conducted for Board of Studies on 26-07-2022 from 10.00 to 12.00 am for all the semesters for the UG programmes B.Sc & B.A under the chairmanship of Dr N.Madhavi (Lecturer-in-charge, Dept of Statistics) with the committee members through offline mode

Agenda Point 1: Program wise Curriculum design for all the semesters

Discussion : A discussion was being held among the members regarding the curriculum design for all the semesters and for all the programmes B.Sc & B.A. The curriculum design was changed from this year 2022-2023 especially for fifth semester and sixth semester apart from all the four semesters. The syllabus for the first four semesters were discussed and decided to continue the same syllabus given as earlier with some added additional inputs into the syllabus. Basing on the syllabus prescribed by APSCHE and following CBCS pattern, it is decided to frame the syllabus with new papers and titles for fifth semester. Electives are being prepared for and the students can choose any one elective from the given electives which consists of two papers in each elective. Also the discussion was held regarding the community service project and internships/ Apprenticeships in second and fourth and sixth semesters.

A new course Mathematics, Statistics and Data Science is being started from this academic year and the syllabus was shown for the first year

Resolution 1: It is resolved to adopt the prescribed syllabus shown for the four semesters for all courses and it is resolved to design the curriculum in such a way that the students must select one elective out of three elective for both B.sc and B.A Programme for fifth semester s and accordingly Curricular and Co-Curricular activities were to be followed

Resolution 2: It is resolved to send the students for Community service project at the end of second semester and mentors were allotted for the batch of students and the project is to be completed within 8 weeks and 100 marks were allotted for this project. Any student who have not undergone the CSP project will be failed.

Resolution 3 :It is resolved to send the students of fourth semester for internship/Apprenticeship for about two months and four months internship/ Apprenticeship after fifth semester

Resolution 4: It is also resolved to send the students for internship in fifth semester and some students in sixth semester basing on the guidelines give by college. The syllabus given for fifth semester will be followed accordingly.

Agenda Point 2: Designing of Course Outcomes and Course Objectives:

Discussion: The members thoroughly verified the prepared programme outcomes, course outcomes and course objectives for all the programmes and courses and satisfied.

Resolution 1: It is resolved to incorporate the programme outcomes, course outcomes and course objectives for all the programmes and courses in an efficient manner.

Resolution 2: It is resolved to incorporate CO PO mapping for all the programmes and courses and to be given in the syllabus

Agenda Point 3: Identification of unit wise assignment questions and relevant model question paper

Discussion: The members pointed out some important questions for assignment purpose keeping in view of examinations and compulsory questions and model question papers were verified

Resolution1 : It is resolved to give assignment questions as suggested by the members

Resolution 2: It is resolved to prepare relevant model question papers for the syllabus framed.

Agenda Point 4: Identifying inclusion of components of Skill Development, Employability and Entrepreneurship in the course content and specific activity proposed

Discussion: Sri K. Ashok (Member of BOS) pointed out the components of skill development, Employability and Entrepreneurship in the course content and accordingly activities like, guest lectures, internships, project works, field works etc are to be prepared

Resolution 1: Basing on the discussion held, it is resolved to identify skill, employability and Entrepreneurship components by specifying with red, green and Yellow colours .

Resolution2 : It is resolved to specify the activity proposed for skill development, Employability and Entrepreneurship in the course content and to be shown in the syllabus

Agenda Point 5: Additional inputs into the curriculum:

Discussion: Sri K. Ashok (Subject Expert) of SRR and CVR college, Vijayawada discussed about the additional inputs into the curriculum wherever necessary to give clear understanding about the topic and these are not included for exam.

Resolution 1: It is resolved to incorporate additional inputs into the curriculum.

Agenda Point 6: Designing Model question Papers and identifying potential paper Setters

Discussion: The members saw the designed model question papers for all the courses and identified the paper setters from various colleges.

Resolution 1: It is resolved to prepare model question papers for both programmes B.Sc and B.A and the model for all the courses is same

Resolution 2: It is resolved to identify efficient paper setters from various colleges and the list of the paper setters is given in the syllabus.

Agenda Point 7: Innovative Teaching—Learning Methodology (Learner Centric)

Discussion:The various methods of Teaching Learning were discussed by all the members. ICT teaching methodology and Blended mode teaching is given more importance by all the members. Online teaching methodology is also preferred and essential way of teaching learning in the present scenario. Google classroom methodology is also preferred in making the students online tests.

Resolution 1:It is resolved by all members to follow latest methodologies and easy way of Teaching Learning in maintaining the students Standards.

Resolution 2:It is resolved to follow blended mode of teaching besides the lecture method, ICT based method etc.

Agenda Point 8: Academic activities of the Department such as Seminars, fieldworks etc.

Discussion: The department conducts National Statistics day, World population day every year and conducts guest lectures, competitions like elocution, Essay writing, quiz etc . Apart from this the department conducts seminars, webinars, extension lectures, fieldworks etc. Chart Exhibition is also celebrated and outside school students were invited to see the chart exhibition.

Resolution 1: It is resolved to conduct department activities, seminars, webinars, guest lectures, field works etc for the students

Resolution 2:It is resolved to conduct chart exhibition to increase the knowledge among the students by way of showing the information in the form of charts.

Agenda Point 9: Assessment Component:

The assessment component is designed as follows:

For I ,II and III year students theory examinations: 100 Marks

External Exam: 50Marks
Internal Exam: 50Marks

The internal exam is based on
30 marks for internal exams (20 for internal tests and 10 for oline exam)

- 5 marks for assignment**
- 5 marks for viva**
- 5 marks for seminars**
- 5 marks for attendance**

Community service project is undertaken by second semester students for 100 marks

The 100 marks were allotted as follows

- | | |
|-------------------------------------|------------------------|
| (i) Project Log Book | ----- -20 Marks |
| (ii) Project Implementation | ----- -30 Marks |
| (iii) Project Report Writing | ----- -25 Marks |
| (iv) Project Viva | ----- -25 Marks |

Practical Examinations would be conducted at the end of the each semesters for B.Sc & B.A for all the three year students and there will be internal evaluation at the end of 1,3,5semesters and external evaluation at the end of 2, 4, 6 semesters for each year.

Practical internal exam will be conducted for all semesters for 50 marks

Agenda Point 9: Any other proposal with the permission of the chair

Discussion: A Certificate course is being handled by the department at the end of fourth semester and the title is Statistical tools for Research Methodology

Resolution 1: It is resolved to run the certificate course this year also

Resolution 2:It is resolved to conduct an exam in the certificate course for 50 marks.

Signatures of the members Present

- 1.
- 2.
- 3.
- 4.
- 5.

Chairman
Board of Studies

Program Specific Outcomes

PROGRAM CODES: B.Sc(M.S.Comp-2209,
 B.Sc(M.E.S)-2109,
 B.Sc(M.S. Actuarial Science)-2214,
 B.Sc(M.S.EM)-2215
 B.Sc(M.S.DS)

Sl. No	Program	PSO
1.	M.S.Comp	Understand the nature and scope of the subjects and basic concepts and terminology of three courses of the program
		Analyse, Compare and Contrast the concepts in all three courses and to draw conclusions effective manner.
		Analytical skills, mathematical modelling , data computation using statistical tools and computer programming knowledge is required.
		Applications of mathematics, Statistics, and Computers are necessary to draw conclusions for a given problem .
		To develop Research thinking in Students in solving practical science problems.
2.	M.E.S	Expose the students to various concept in Economics, Mathematics and Statistics and encourage them to uphold scientific integrity and objectivity in professional knowledge.
		Understand and develop excellent mathematical, statistical and problem-solving skills
		Solve and understand the ability to solve economic problems and to estimate future prediction by means of mathematics and statistics models.
		To develop analytical and research skills and to carry out studies regarding economic scenarios.
3.	M.S.As	Understand the basic concepts of Financial Mathematics, Statistical tools and techniques, nature and scope of economics, commercial life insurance policies, actuarial science concept.
		Strong knowledge of statistical methodology and its applications in the fields of economics, economic management, finance, insurance
		Deep knowledge of mathematical models, specifically probability models to apply to finance and actuarial phenomena as well as economic and corporate sciences.
		Deep knowledge of quantitative models in the area of risk management.

		Application of mathematical and statistical methods to assess risk in insurance, finance and other industries and professions.
4.	M.S.Ecom	Understand the concepts of mathematics, statistics econometrics
		Applicaion of statistical methods to economic data in order to give empirical content to economic relationships.
		Know the use of statistical theory and mathematical statistics to evaluate and develop econometric methods.
		Analyse the tools and techniques of mathematics and statistics to economic theory.
5.	M.S.DS	Understand the nature and scope of the subjects and basic concepts and terminology of three courses of the program
		Analyse, Compare and Contrast the concepts in all three courses and to draw conclusions effective manner.
		Analytical skills,mathematical modelling , data computation using statistical tools and computer programming knowledge is required.
		Applications of mathematics, Statistics, and Data science are necessary to draw conclusions for a given problem .
		To develop Research thinking in Students in solving practical science problems.


GOVERNMENT COLLEGE (A) RAJAMAHENDRAVARAM

DEPARTMENT OF STATISTICS

B.Sc. (M.S.Cs, M.E.S, M.S.AS, M.S.EM, & M.S.DS)

PROGRAM CODE: 2/1/E (M.E.S) & 2/2/E (M.S.Cs), (M.S.AS), (M.S.EM), (M.S.DS)

S.NO	SEMESTER	TITLE OF THE PAPER	COURSE CODE
1	I	Descriptive Statistics	STT401
2	II	Probability and Probability Distributions	STT402
3	III	Inferential Statistics	STT203
4	IV	Paper-IV-Sampling techniques and Design of Experiments	STT204
5	IV	Paper-V-Applied Statistics	STT205
6	V	A1-Optimization Techniques	STT206
7	V	A2-Operation Research	STT207
8	V	B1-Demography and Vital Statistics	STT208
9	V	B2-Quality & Reliability	STT209
10	V	C1-Regression Analysis	STT210
11	V	C2-Forecasting Methods	STT211

	Government College (Autonomous) Rajahmundry	Program & Semester I B.Sc. (I Sem)			
Course Code STT401	TITLE OF THE COURSE Descriptive Statistics				
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:	Basic Knowledge in Mathematics & Statistics	0	4	3	3

Course Objectives:

1. To describe the basic features of the data in a study. They provide simple summaries about the sample and the measures
2. To distinguish Descriptive Statistics from inferential statistics.
3. To describe the tools of statistics and usage of tools

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	learn about basic concepts of Statistics
CO2	learn about various measures of Central tendency and also various dispersion
CO3	learn about Skewness and kurtosis
CO4	know about Probability Concept and Random variables
CO5	know about Expectations

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
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Syllabus:

UNIT-I

Introduction to Statistics: Importance of Statistics. Scope of Statistics in different fields. Surveys and types . Concepts of primary and secondary data ,Questionnaire and schedule ,Raw data and editing of Data.

UNIT-II

Classification and Tabulation of Data:

Concept of Classification, types of classification, Frequency distribution and its types , Tabulation and Simple and Complex Tables.

UNIT-III

Diagrammatic and graphical representation of data: Histogram, frequency polygon, Ogives, Pie Various types of Graph charts and difference Between charts and diagrams

UNIT-IV

Measures of Central Tendency: **Mean, Median, Mode, Geometric Mean and Harmonic Mean. Median and Mode through graph. Partition values-Quartiles ,Deciles and Percentiles.**

UNIT-V

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.

Text books:

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan.
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. B.A/B.Sc Statistics Descriptive Statistics and Probability, Kalyani Publishers by D.V.L.N. Jogiraju, C. Srikala and L.P. Raj Kumar

Reference books:

1. Willam Feller: Introduction to Probability theory and its applications. Volume –I, Wiley
2. Goon AM, Gupta MK, Das Gupta B: Fundamentals of Statistics, Vol-I, the World Press Pvt.Ltd. Kolkata.


Web Links:

1. <https://conjointly.com/kb/descriptive-statistics/>
2. https://en.wikipedia.org/wiki/Descriptive_statistics
3. <https://www.scribbr.com/statistics/descriptive-statistics/>

CO-PO Mapping:

(1:Slight[Low]; 2:Moderate[Medium]; 3:Substantial[High], '-':No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	1	2	2	1	2	3	3	2	2	2	1	2	2
CO2	2	1	3	2	1	1	2	3	2	2	2	2	2
CO3	1	2	2	3	3	2	1	1	2	3	2	2	1
CO4	2	2	3	2	2	2	2	2	2	2	2	2	2
CO5	1	2	1	2	1	2	2	1	1	1	1	1	2

	Government College (Autonomous) Rajahmundry	Program & Semester I B.Sc (I Sem)			
Course Code STT401	TITLE OF THE COURSE Descriptive Statistics				
Teaching	Hours Allocated: (Lab)	L	T	P	C
Pre-requisites:	Basic Knowledge in Mathematics	0	0	3	2

Objectives:

1. To know how to interpret statistical data through diagrams (graphs)
2. To know the calculation of mean, median and mode
3. To know the calculation of Measures of dispersion, Skewness and Kurtosis

List of Experiments/Syllabus:

(Conduct any FIVE Practical's)

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, β_1 and β_2 for ungrouped data.
6. Computation of Karl Pearson's coefficients of Skewness and Bowley's coefficients of Skewness.

Referencebooks:

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan.
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. B.A/B.Sc Statistics Descriptive Statistics and Probability, Kalyani Publishers by D.V.L.N. Jogiraju, C. Srikala and L.P. Raj Kumar

Virtual Lab Links:

1. <https://conjointly.com/kb/descriptive-statistics/>
2. https://en.wikipedia.org/wiki/Descriptive_statistics
3. <https://www.scribbr.com/statistics/descriptive-statistics/>
4. <https://byjus.com/maths/probability-and-statistics/>
5. <https://oli.cmu.edu/courses/probability-statistics-open-free/>

GOVERNMENT COLLEGE (A) RAJAMAHENDRAVARAM
CBCS SYLLABUS (Semester Wise) 2022-23
Descriptive Statistics
MODEL QUESTION PAPER

Time: 2 1/2 hrs.

Max Marks: 50

SECTION-A

Answer any FIVE questions.

5X4= 20M

1. Distinguish between Questionnaire and Schedule?
2. Write short note on Diagrams and its types?
3. Explain types of classification?
4. Explain about Mean Deviation?
5. Explain Kurtosis?
6. Explain types of moments?
7. What are Partition values?
8. Find Mean, Median and Mode to the following data 6,6,7,8,8,8,2,5,6,9, and 5

SECTION – B

Answer Any THREE questions.

3X10=30M

9A. Define various definitions of Statistics and its limitations

(OR)

**9B. What do you understand by collection of data? What are its objectives?
Discuss different methods**

10A. Draw a Histogram ,Frequency polygon and Ogive curve to the given data

Class Intervals	0-10	10-20	20-30	30-40	40-50
Students	12	24	15	7	11


(OR)

10B. Describe the different measures of central tendency and discuss their merits and demerits.

11A. Explain the methods of measuring skewness and kurtosis of a frequency distribution.

(OR)

11B Describe the different measures of dispersion and discuss their merits and demerits.

	Government College (Autonomous) Rajahmundry	Program & Semester I B.Sc (II Sem)			
Course Code STT402	TITLE OF THE COURSE Probability and Probability Distributions				
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:	Basic Knowledge in Probability, Distributions and methods in statistics	0	4	3	3

Course Objectives:

1. A. To gain knowledge in probability and its applications
2. B. To study about discrete and continuous distributions
3. C. To study about the various methods in statistics

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Learn about Probability, its techniques and applications
CO2	Learn about Random variables
CO3	Learn about Mathematical Expectations.
CO4	Learn about discrete and continuous distributions and their applications
CO5	solve the practical examples of both continuous and discrete in their real life

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
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Syllabus:

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 and its applications in real life problems.

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

UNIT-III

Mathematical expectation : Mathematical expectation of a random variable and its Properties. 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

Unit-IV

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

Additional Inputs:Compound distribution

Unit-V

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

Textbooks:

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

Referencebooks:

1. Willam Feller: Introduction to Probability theory and its applications. Volume –I, Wiley
- 2.


WebLinks:

https://en.wikipedia.org/wiki/List_of_probability_distributions#Discrete_distrib

CO-PO Mapping:

(1:Slight[Low]; 2:Moderate[Medium]; 3:Substantial[High], '-':No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	1	2	2	1	2	2	3	2	3	2	2	2	2
CO2	2	1	2	2	1	1	2	3	1	2	2	2	2
CO3	1	1	2	3	2	1	1	2	2	2	1	2	1
CO4	2	2	3	2	2	2	2	2	2	2	2	2	2
CO5	2	2	1	1	1	2	2	1	1	1	1	1	2

	Government College (Autonomous) Rajahmundry	Program & Semester I B.Sc. (II Sem)			
Course Code STT402	TITLE OF THE COURSE Probability and Probability Distributions				
Practical	Hours Allocated: 30 hrs	L	T	P	C
Pre-requisites:	Basic knowledge in Sampling concept	0	4	3	3

Objectives:

1. A. To gain knowledge in probability and its applications
2. B. To study about discrete and continuous distributions
3. C. To study about the various methods in statistics

List of Experiments/Syllabus:

(Conduct any FIVE Practical's)

1. Fitting of Binomial distribution – Directmethod.
2. Fitting of binomial distribution – Recurrence relationMethod.
3. Fitting of Poisson distribution – Directmethod.
4. Fitting of Poisson distribution – Recurrence relationMethod.
5. Fitting of Normal distribution.
6. Fitting of Normal distribution.
7. Fitting of Geometric distributions
8. Fitting of Negative Binomial Distribution.

Reference books:

1. Willam Feller: Introduction to Probability theory and its applications. Volume –I, Wiley
2. Goon AM, Gupta MK, Das Gupta B: Fundamentals of Statistics, Vol-I, the World Press Pvt.Ltd. Kolkata.

Virtual Lab Links:

1. https://en.wikipedia.org/wiki/Probability_distribution
2. https://en.wikipedia.org/wiki/List_of_probability_distributions#Discrete_distributions
3. <https://byjus.com/maths/probability-and-statistics/>

Government College [A] Rajamahendravaram

CBCS SYLLABUS (Semester Wise) 2022-23

I B.Sc Statistics/Semester-II

(With Mathematics Combination)

Probability & Probability Distributions

Time: 2 ½ hrs

MODEL PAPER

Max Marks: 50

SECTION-A

Answer any FIVE questions.

5 X4 =20M

1. Write short note on Probability?
2. Define Poisson Distribution and its properties
3. Explain Types of Random Variables?
4. Give the Applications of Normal distribution
5. Explain Boole's inequality
6. Explain Cauchy - Schwartz inequalities
7. Write about Uniform Distribution?
8. What is the Probability that a leap year contains 53 Sundays?

SECTION-B

Answer any THREE questions

3X10=30M

9A. Explain Types of Probabilities

(OR)

9B. A random variable X has the following function

X	-2	-1	0	1	2	3
P(X)	0.1	K	0.2	2K	0.3	K

Find (i) Mean and variance

(ii) Construct distribution function and draw its graph

10A. Explain Chebyshev Inequality?


(OR)

10B. Explain theorem on Expectations?

11A. Write about Binomial distribution and its properties

(OR)

11B. Define Normal distribution. Mention its properties

	Government College (Autonomous) Rajahmundry	Program & Semester II B.Sc. (III Sem)			
Course Code STT203	TITLE OF THE COURSE Inferential Statistics				
Practical	Hours Allocated: 30 hrs	L	T	P	C
Pre-requisites:	Basic knowledge in Sampling concept	0	4	3	3

Objectives:

1. To The course aims at providing an introduction to statistical inference and its application to predictive statistical models.
2. The first part of the course will focus on basic probability.
3. Subsequently, the course will deal with the theory of statistical inference (point estimation, interval estimation, hypothesis testing).

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	Students would be able to learn about estimation concept
CO2	Students would be able to learn about Hypothesis and its procedure
CO3	Students would be to learn large sample tests and small sample tests
CO4	Students would be able to learn about Non parametric tests
CO5	Students would be to learn computation part

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
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Syllabus:

Unit – I

Theory of Estimation: Estimation of a parameter, criteria of a good estimator-Unbiasedness, consistency, efficiency and sufficiency. Statement of Neyman's factorization theorem. Methods of Estimation

Additional Inputs:Cramer Rao Inequality

Unit-II

Concepts of Statistical hypothesis: 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 fundamental lemma. Examples in case of Binomial, Poisson, Exponential and Normal distributions.

Unit – III

Large sample tests: Large sample tests for single mean, two means, single proportion, two proportions, Standard deviation of single and double samples and Fisher's Z transformation.

Unit – IV

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

Additional Inputs: Exact sampling Distributions

Unit – V Non-parametric tests: Advantages and disadvantages, Two sample run test, Two sample Median test and Two sample sign test.

Textbooks:

1. B.A/B.Sc II Year statistics-statistical methods and inference-Telugu Academy by A.Mohanrao, N.SrinivasaRao, Dr.R.Sudhakara Reddy,Dr.T.C. Ravichandrakumar
2. K.V.S.Sarma Statistics Made simple: Do it yourself on PC, PHI.
3. B.A/B.Sc Statistics Descriptive Statistics and Probability, Kalyani Publishers by D.V.L.N. Jogiraju, C. Srikala and L.P. Raj Kumar.

Reference books:

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand&Sons, New Delhi
2. Goon AM, Gupta MK, Das Gupta B : Outlines of Statistics , Vol-II, the World Press Pvt.Ltd, Kolkata.
3. Hoel P.G: Introduction to mathematical statistics, Asia Publishing house.


WebLinks:

1. <https://conjointly.com/kb/descriptive-statistics/>
2. https://en.wikipedia.org/wiki/Descriptive_statistics
3. <https://www.scribbr.com/statistics/descriptive-statistics/>
4. <https://byjus.com/maths/probability-and-statistics/>

CO-PO Mapping:

(1:Slight[Low]; 2:Moderate[Medium]; 3:Substantial[High]'-':No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	1	2	2	1	2	2	3	2	3	2	2	2	2
CO2	2	1	2	2	1	1	2	3	1	2	2	2	2
CO3	1	1	2	3	2	1	1	2	2	2	1	2	1
CO4	2	2	3	2	2	2	2	2	2	2	2	2	2
CO5	2	2	1	1	1	2	2	1	1	1	1	1	2

	Government College (Autonomous) Rajahmundry	Program & Semester II B.Sc. (III Sem)			
Course Code STT203	TITLE OF THE COURSE Inferential Statistics				
Practical	Hours Allocated: 30 hrs	L	T	P	C
Pre-requisites:	Basic knowledge in Sampling concept	0	2	3	2

Objectives:

1. To The course aims at providing an introduction to statistical inference and its application to predictive statistical models.
2. The first part of the course will focus on basic probability.
3. Subsequently, the course will deal with the theory of statistical inference (point estimation, interval estimation, hypothesis testing).

Practical's Semester (IV)

Conduct any 6 (MS-Excel is compulsory)

1. Large sample tests for mean(s)
2. Large sample tests for proportion(s)
3. Large sample test for standard deviation(s)
4. Large sample tests for Fisher's Z-transformation
5. Small sample tests for Paired t-test
6. Chi-Square test for independence of attributes.
7. Non-Parametric tests-run test
8. Non-parametric tests-median test.
9. Non-Parametric tests-sign tests.
10. MS-Excel methods for the above serial numbers 1, 2, 3, 4(any one of above).

Reference books:

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand&Sons, New Delhi
2. Goon AM, Gupta MK, Das Gupta B : Outlines of Statistics , Vol-II, the World Press Pvt.Ltd, Kolkata.
3. Hoel P.G: Introduction to mathematical statistics, Asia Publishing house.

Virtual Lab Links:

1. <https://conjointly.com/kb/descriptive-statistics/>
2. https://en.wikipedia.org/wiki/Descriptive_statistics

Government College [A] Rajamahendravaram

CBCS SYLLABUS (Semester Wise) 2022-23

II B.Sc Statistics/Semester-III

Paper-III-Inferential Statistics

MODEL QUESTION PAPER (THEORY)

Time: 2 1/2 hrs

Max Marks: 50

SECTION-A

Answer any FIVE questions. All questions carry equal marks.

5 x 4 = 20M

1. What is MLE and write its properties
2. Explain Confidence Intervals.
3. Explain Null hypothesis and Alternative hypothesis.
4. Define one tailed and two tailed tests.
5. Explain paired t- test.
6. Explain about sign test for one sample .
7. Explain chi-square test for independence of attributes.
8. Write the assumptions of non parametric tests

SECTION-B

Answer any THREE questions. All questions carry equal marks.

3 x 10 = 30M

9A. Explain the criteria of a good estimator.

(OR)

9B. Explain different Methods of Estimation

10A. State and prove Neyman-Pearson's Lemma.

(OR)

10B. Explain the test procedure for


(i) Testing of Mean and (ii) Equality of two means

11A. The following data obtained from a survey conducted about 320 families who are having five children. Fit a Binomial distribution for the data with $p = \frac{1}{2}$ and test the goodness of fit.

No. of boys	0	1	2	3	4	5
No. of families	14	56	110	88	40	12

(OR)

11B. What are the differences between parametric tests non-parametric tests?

	Government College (Autonomous) Rajahmundry	Program & Semester II B.Sc. (IVSem) Paper-IV			
Course Code STT204	TITLE OF THE COURSE Sampling Techniques & Design of Experiments				
Practical	Hours Allocated: 30 hrs	L	T	P	C
Pre-requisites:	Basic knowledge in methods and Statistical inference	0	4	3	3

Objectives:

1. The aim of this paper is to introduce you to the statistical aspects associated with the design and analysis of sample surveys, and to develop your understanding of the principles and methods used to design survey sampling schemes.
2. Basic theory underpinning survey inference will be introduced, focusing on methodology for survey-based estimation for population totals and related quantities for some standard sample designs

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	Students would be able to learn about the sampling methods
CO2	Students would be able to learn about types of sampling
CO3	Students would be able to learn about simple random sampling
CO4	Students would be able to learn about Anova and Designs
CO5	Students would be able to learn about CRD,RBD,LSD

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
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Syllabus:

Unit – I

Sampling theory:

Concepts of population, sample, sampling unit, parameter, statistic, sampling errors, sampling distribution, sample frame and standard error. Principal steps in a sample survey- need for sampling, census versus sample surveys, sampling and non- sampling errors, Types of sampling- Subjective, probability and mixed sampling methods

Unit-II

Simple random Sampling:

Methods of drawing random samples with and without replacement. Estimation of population mean, total, variances and the estimates in SRSWR and SRSWOR Advantages and Disadvantages of simple random sampling.

Unit-III

Stratified random Sampling:

Proportional and optimum allocation of sample sizes in stratification. Variances in these methods. Systematic sampling: Systematic sampling when $N = nk$. Comparison of their relative efficiencies. Advantages and Disadvantages of above methods of sampling.

Unit-IV

Analysis of Variance:

One way with equal and unequal classifications and two way classifications.

Unit-V

Design of experiments:

Principles of experimentation in designs, Analysis of Completely randomized Design (C.R.D), Randomized Block Design (R.B.D) and Latin Square Design (L.S.D) including one missing observation, Comparison of the efficiencies of above designs.

Additional Inputs: $2^2, 2^3, 3^2$ Designs

Textbooks:

1. B.A/B.Sc III Year Paper-III Statistics- Applied Statistics- Telugu Academy by Prof. K. Srinivasa Rao, Dr. D. Giri, Dr. A. Anand, and Dr. V. Papaiah Sastry.
2. K.V.S. Sarma: Statistics made simple: do it yourself on PC. PHI
3. B.A/B.Sc Statistics Applied Statistics, Kalyani Publishers by D.V.L.N. Jogiraju, C. Srikala and L.P. Raj Kumar.

Reference books:

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Applied Statistics. Sultan Chand
2. Parimal Mukhopadhyay: Applied Statistics. New Central Book agency.
3. S.P.Gupta: Statistical Methods. Sultan Chand and Sons.

WebLinks:


<https://conjointly.com/kb/descriptive-statistics/>

https://en.wikipedia.org/wiki/Descriptive_statistics

CO-PO Mapping:

(1:Slight[Low]; 2:Moderate[Medium]; 3:Substantial[High] '-' :No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	2	2	2	2	2	2	3	2	3	2	1	2	2
CO2	2	1	3	2	2	2	2	3	3	2	2	2	2
CO3	2	3	2	3	3	3	2	2	2	3	2	2	1
CO4	2	3	3	2	2	2	1	2	1	2	2	1	2
CO5	1	2	2	2	2	2	2	2	2	1	2	1	2

	Government College (Autonomous) Rajahmundry	Program & Semester II B.Sc.(IV Sem) Paper-IV			
Course Code STT204	TITLE OF THE COURSE Sampling Techniques & Design of Experiments				
Practical	Hours Allocated: 30 hrs	L	T	P	C
Pre-requisites:	Basic knowledge in methods and Statistical inference	0	4	3	3

Objectives:

1. The aim of this paper is to introduce you to the statistical aspects associated with the design and analysis of sample surveys, and to develop your understanding of the principles and methods used to design survey sampling schemes.
2. Basic theory underpinning survey inference will be introduced, focusing on methodology for survey-based estimation for population totals and related quantities for some standard sample designs

Practical's Semester-V(Paper-V)

Conduct any 6 (MS-Excel is compulsory)

1. Estimation of Population Mean, Variance by SRSWOR.
2. Estimation of Population Mean, Variance by SRSWR.
3. Comparison of Proportional, Optimum allocations with Stratified Random sampling
4. Systematic Sampling.
5. ANOVA-CRD
6. ANOVA-RBD with one missing observation.
7. ANOVA-LSD with one missing observation.
8. MS-Excel Practical's.

Reference books:

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Applied Statistics. Sultan Chand
2. Parimal Mukhopadhyay: Applied Statistics. New Central Book agency.
3. S.P.Gupta: Statistical Methods. Sultan Chand and Sons.

Virtual Lab Links:

1. <https://digitalelearnings.com/sampling-and-types-of-sampling>.
2. <https://youtu.be/k3IUo0XYG3E>

GOVERNMENT COLLEGE (A) RAJAMAHENDRAVARAM

II B.Sc. Statistics (Semester-IV) 2022-23

(With Mathematics Combination)

Paper-IV- Sampling Techniques & Design of Experiments

MODEL QUESTION PAPER (THEORY)

Time: 2 1/2 hrs.

Max Marks: 50

SECTION-A

Answer any FIVE questions.

5 X4 =20M


- 1 Distinguish between census survey and sample surveys.**
- 2 Define SRSWR and SRSWOR.**
- 3 Explain Systematic Sampling.**
- 4 Explain the purpose of ANOVA.**
- 5 Explain about CRD**
- 6 What are different types of sampling**
- 7 Explain types of allocation in stratified sampling.**
- 8 Systematic Sampling VS Stratified Sampling**

SECTION-B

Answer any THREE questions.

3 x 10 = 30 M

- 9A What are principal steps in a sample survey.**
(OR)
- 9B Derive the variance of the sample mean in SRSWOR.**
- 10A What are simple random samples? Explain the methods of selecting simple random samples.**
(OR)
- 10B If the population consists of linear trend, then prove that**
$$V(Y_{st}) \leq V(Y_{sys}) \leq V(Y_n)_R$$
- 11A Discuss about basic principles of experimentation**
(OR)
- 11B Explain LSD and merits, demerits of LSD**

	Government College (Autonomous) Rajahmundry	Program & Semester II B.Sc. (IV Sem) Paper-V			
Course Code STT205	TITLE OF THE COURSE APPLIED STATISTICS				
Theory	Hours Allocated: 30 hrs	L	T	P	C
Pre-requisites:	Basic knowledge in Statistical functions	0	4	3	3

Objectives:

1. After completion of this paper the students would be able to learn the applied part of statistics in various disciplines and also learn the opportunities of statistician in different fields.

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	Students would be able to learn about Time series and its components, Determination of trend by least squares, moving averages methods and to determine seasonal indices by Ratio to moving average, ratio to trend and link relative methods.
CO2	Students would be able to know the functions and organization of CSO and NSSO, National income and its computation,
CO3	Students would be able to know about the definition, uses of vital statistics and its sources, Various mortality and fertility rates, Life tables-its construction and uses.
CO4	Students must be able to know about different types of Reproduction rates and abridged life tables.
CO5	Students would able to learn applications of it.

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
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Syllabus:

Unit-I

Analysis of Time series: Components of time series: meaning and examples, trend by least squares (straight-line and parabola) methods and moving average methods. Seasonal indices by Simple averages, ratio to moving average, ratio to trend and link relative methods.

Unit-II

Index Numbers: Meaning, problems involved in the construction of index numbers, simple and weighted index numbers, Criteria of good index numbers, fixed base and chain base index numbers. Cost of living index numbers, Wholesale price index numbers, Base shifting, Splicing and deflation of index numbers.

Unit-III

Official Statistics: Functions and organization of CSO and NSSO. Agricultural Statistics, area and yield statistics. National Income and its computation, utility and difficulties in estimation of national income

Additional Inputs: Demand analysis

Unit –IV

Vital statistics: Meaning, Definition, Uses, Sources of vital statistics, Various Death rates- CDR, ASDR, STDR and Birth rates- CBR, ASFR, TFR.

Additional Inputs: Migration Rates

Unit-V

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

Textbooks:

1. **Fundamentals of Applied Statistics: VK Kapoor and SC Gupta**
2. **B.A/B.Sc III year paper-IV Statistics- Applied Statistics- Telugu Academy by Prof K. Srinivasa Rao, Dr. D. Giri, Dr A. Anand, Dr V. Papaya Sastry.**
3. **B.A/B.Sc Statistics Applied Statistics, Kalyani Publishers by D.V.L.N. Jogiraju, C. Srikala and L.P. Raj Kumar.**

Reference books:

1. **Indian Official Statistics- MR Saluja**
2. **Anuvartita Sankhyaka sastram – Telugu Academy**


Web Links:

1. <https://youtu.be/k3IUo0XYG3E>
2. <https://youtu.be/qSUjVDbKLWQ>

CO-PO Mapping:

(1:Slight[Low]; 2:Moderate[Medium]; 3:Substantial[High]'-':No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	2	2	2	1	2	1	3	2	3	2	1	2	2
CO2	2	1	3	2	1	2	2	3	1	3	2	2	2
CO3	1	2	2	3	3	1	2	1	2	3	2	2	1
CO4	2	2	3	2	2	2	1	2	1	2	2	1	2
CO5	2	2	1	3	2	2	2	1	2	1	2	2	2

	Government College (Autonomous) Rajahmundry	Program & Semester II B.Sc. (IV Sem) Paper-V			
Course Code STT205	TITLE OF THE COURSE APPLIED STATISTICS				
Practical	Hours Allocated: 30 hrs	L	T	P	C
Pre-requisites:	Basic knowledge in Statistical functions	0	0	3	3

Objectives:

1. After completion of this paper the students would be able to learn the applied part of statistics in various disciplines and also learn the opportunities of statistician in different fields.

Practical's Semester-IV

Conduct any 6 (MS-Excel is compulsory)

1. Measurement of Linear Trend
2. Measurement of Seasonal Indices-Link Relatives method
3. Reversal tests
4. Cost of Living Index Numbers.
5. Mortality, Fertility and Reproduction rates.
6. Life Tables.
7. MS-Excel Practical

Reference books:

1. Indian Official Statistics- MR Saluja
2. Anuvartita Sankhyakasastram – Telugu Academy

Virtual Lab Links:

1. <https://youtu.be/k3IUo0XYG3E>
2. <https://youtu.be/qSUjVDbKLWQ>
3. <https://youtu.be/8DaOIjuF4BY>

Government College [A] Rajamahendravaram

CBCS SYLLABUS (Semester Wise) 2022-23

II B.Sc Statistics/Semester-IV

PAPER V-APPLIED STATISTICS

MODEL QUESTION PAPER (THEORY)

Time: 2 1/2 hrs

Max Marks: 50

SECTION-A

Answer any five questions. All questions carry equal marks.

5x 4= 20M

- 1. Explain the method of Simple averages**
- 2. Explain Cost of living Index numbers**
- 3. Explain NSSO**
- 4. What are the sources of vital statistics**
- 5. Explain Abridged life tables.**
- 6. Explain the use of National income**
- 7. Explain Gross reproduction rate and Net reproduction rate.**
- 8. Explain Methods population growth rates.**

SECTION-B

Answer any THREE questions. All questions carry equal marks.

3 x 10 = 30M

9A.Explain the components of Time series?

(OR)

9B.Explain the problems involved in the construction of index numbers

10A. Explain the criteria of a good index number?


(OR)

10 B. Explain the functions and organization of CSO?

11A.Explain about various death rates?

(OR)

11B.Explain life table and its Construction ?

	Government College (Autonomous) Rajahmundry	Program & Semester III B.Sc. (V Sem) Paper-VI			
Course Code STT206	TITLE OF THE COURSE OPTIMIZATION TECHNIQUES				
Theory	Hours Allocated: 30 hrs	L	T	P	C
Pre-requisites:	Basic knowledge in Statistical functions	0	4	3	3

Objectives:

1. After completion of this paper the students would be able to learn the applied part of statistics in various disciplines and also learn the opportunities of statistician in different fields.

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	Students would be able to learn about basics of Operation research
CO2	Students would be able to know concepts of optimization techniques
CO3	Students would be able to know about Transportation problems
CO4	Students must be able to know about different types of assignment problems
CO5	Students would be able to learn Sequencing methods.

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
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Syllabus:

Unit-I

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

Unit-II

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

Unit –III

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 though the MODI (U- V) method and stepping stone method for balanced and unbalanced

Unit- IV

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

Unit-V

Sequencing problem: Optimal Sequencing of N jobs on two and three machines without passing

Textbooks:

- 1) Operations Research by Kanthi Swaroop k.GUPTA AND ManMohan –Sultan Chand
- 2) Operation Research- S.D Sharma

Reference books:

- 3) Operation Research – Taha


Web Links:

1. <https://youtu.be/k3IUo0XYG3E>
2. <https://youtu.be/qSUjVDbKLWQ>

CO-PO Mapping:

(1:Slight[Low]; 2:Moderate[Medium]; 3:Substantial[High] '-' :No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	2	2	2	1	2	1	3	2	3	2	1	2	2
CO2	2	1	3	2	1	2	2	3	1	3	2	2	2
CO3	1	2	2	3	3	1	2	1	2	3	2	2	1
CO4	2	2	3	2	2	2	1	2	1	2	2	1	2
CO5	2	2	1	3	2	2	2	1	2	1	2	2	2

	Government College (Autonomous) Rajahmundry	Program & Semester IIB.Sc. (V Sem) Paper-VI			
Course Code STT206	TITLE OF THE COURSE OPTIMIZATION TECHNIQUES				
Practical	Hours Allocated: 30 hrs	L	T	P	C
Pre-requisites:	Basic knowledge in Statistical functions	0	0	3	3

Objectives:

After completion of this paper the students would be able to learn operation research in various disciplines and also learn the opportunities of statistician in different fields.

Practical's Semester-IV

Conduct any 6 (MS-Excel is compulsory)

Practicals-Semester-VI

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.

Reference books:

- 1) Operations Research by Kanthi Swaroop k.GUPTA AND ManMohan –Sultan Chand
- 2) Operation Research- S.D Sharma

Virtual Lab Links:

1. <https://youtu.be/k3IUo0XYG3E>
2. <https://youtu.be/qSUjVDbKLWQ>
3. <https://youtu.be/8DaOIjuF4BY>

Government College [A] Rajamahendravaram

CBCS SYLLABUS (Semester Wise) 2022-23

III B.Sc Statistics/Semester-V

OPTIMIZATION TECHNIQUES ((Cluster-1, Paper-1) Paper –VI-A1

MODEL QUESTION PAPER (THEORY)

Time: 2 1/2 hrs

MaxMarks: 50

SECTION-A

Answer any FIVE questions. All questions carry equal marks.

5 x 4=20M

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 Any THREE questions. All questions carry equal marks.

3 x 10= 30M

9A. Describe the Nature and Scope of O.R

(OR)

9B. Solve the Following LPP by using Graphical Method

Maximize $Z=45X_1+80X_2$

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

10A. 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)


10B. Explain North-West Corner Rule and Least Cost Entry Methods for a given TP

11A. 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

(OR)

11B. Give an algorithm for n job-2 machines problem.

	Government College (Autonomous) Rajahmundry	Program & Semester III B.Sc. (V Sem) Paper-VII			
Course Code STT207	TITLE OF THE COURSE OPERATION RESEARCH				
Theory	Hours Allocated: 30 hrs	L	T	P	C
Pre-requisites:	Basic knowledge in Statistical functions	0	4	3	3

Objectives:

After completion of this paper the students would be able to learn the applied part of statistics in various disciplines and also learn the opportunities of statistician in different fields.

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	Students would be able to learn about game theory and its problems
CO2	Students would be able to know concepts of Inventories
CO3	Students would be able to know about Networking
CO4	Students must be able to know about different networking models
CO5	Students would able to learn queuing models

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
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Syllabus:

Unit-I

Game and strategies:

Introduction, Two person zero sum game, Saddle point, Dominance property, $2 \times n, n \times 2$ games- Graphical method.

Unit-II

Inventory control:

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

Unit-III

Net work scheduling-I:

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

Unit-IV

Net work 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

Unit-V

Queuing theory:

Introduction, Queuing system and its elements, characteristics of queuing system. Classification of queuing models and types of queuing systems.

Practicals-Semester-VI

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

Textbooks:

1. Kanti Swaroop, P.K.Gupta and Man Mohan: Operations Research. Sultan Chand.
2. Taha: Operations Research: An Introduction: Mac Millan.

Reference books:

- 3) Operation Research – Taha


Web Links:

1. <https://youtu.be/k3IUo0XYG3E>
2. <https://youtu.be/qSUjVDbKLWQ>

CO-PO Mapping:

(1:Slight[Low]; 2:Moderate[Medium]; 3:Substantial[High] '-':No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	2	2	2	1	2	1	3	2	3	2	1	2	2
CO2	2	1	3	2	1	2	2	3	1	3	2	2	2
CO3	1	2	2	3	3	1	2	1	2	3	2	2	1
CO4	2	2	3	2	2	2	1	2	1	2	2	1	2
CO5	2	2	1	3	2	2	2	1	2	1	2	2	2

	Government College (Autonomous) Rajahmundry	Program & Semester IIB.Sc. (V Sem) Paper-VI			
Course Code STT207	TITLE OF THE COURSE OPERATION RESEARCH				
Practical	Hours Allocated: 30 hrs	L	T	P	C
Pre-requisites:	Basic knowledge in Statistical functions	0	0	3	3

Objectives:

After completion of this paper the students would be able to learn operation research in various disciplines and also learn the opportunities of statistician in different fields.

Practical's Semester-IV

Conduct any 6 (MS-Excel is compulsory)

Practicals-Semester-VI

7. Solving LPP by Graphical method
8. Solving the TP by NWCR, Matrix Minimum and VAM methods
9. Game theory-obtaining saddle point and pure, mixed strategies
10. Finding solution for Hungarian Method
11. Optimal solution for Assignment problem
12. Solving sequencing problem for jobs on two machines.

Reference books:

- 1) Operations Research by Kanthi Swaroop k.GUPTA AND ManMohan –Sultan Chand
- 2) Operation Research- S.D Sharma

Virtual Lab Links:

1. <https://youtu.be/k3IUo0XYG3E>
2. <https://youtu.be/qSUjVDbKLWQ>
3. <https://youtu.be/8DaOIjuF4BY>

Government College [A] Rajamahendravaram

CBCS SYLLABUS (Semester Wise) 2022-23

III B.Sc Statistics/Semester-V

(With Mathematics Combination)

OPERATION RESEARCH Paper –VII-A2

MODEL QUESTION PAPER (THEORY)

Time: 2 1/2 hrs

Max Marks: 50

SECTION-A

Answer Any FIVE questions. All questions carry equal marks.

5x 4= 20M

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 game theory.
5. Write basic steps in PERT technique
6. Write rules for drawing net work diagram.
7. Explain Errors in networking
8. Write short note on queuing theory.

SECTION-B

Answer any THREE questions. All questions carry equal marks.

3x10=30

9A. Find optimal strategies for the games for which for the pay off matrices are given below also find the value of the game.(PROBLEM)

(OR)

9B. Write procedure of graphical method to solve $2 \times n$ games

10A. a) Explain the cost associate with inventories

b) Explain probabilistic inventory models without setup cost

(OR)


10B . 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

11A.Explain the differences between CPM and PERT

(OR)

11B.Explain any two models in Poisson queuing system.

	Government College (Autonomous) Rajahmundry	Program & Semester III B.Sc. (V Sem) Paper-VI			
Course Code STT208	TITLE OF THE COURSE DEMOGRAPHY & VITAL STATISTICS				
Theory	Hours Allocated: 30 hrs	L	T	P	C
Pre-requisites:	Basic knowledge in Statistical functions	0	4	3	3

Objectives:

After completion of this paper the students would be able to learn the applied part of statistics in various disciplines and also learn the opportunities of statistician in different fields.

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	Students would be able to learn about basics of Demography
CO2	Students would be able to know concepts of Population theories
CO3	Students would be able to know about measures of Mortality
CO4	Students must be able to know about different types of fertility
CO5	Students would able to learn Migration methods

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
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Syllabus:

Unit-I

Population Theories: Introduction to Population Studies and Theories related Demography and Vital statistics and Sources of Vital Statistics.

Unit-II Measurement of Mortality: **Crude Death Rate (CDR), Specific death rate (SDR), Infant mortality, Rate(IMR) and Standardised death rates .Under five death rates and their importance. 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.**

Unit –III

Measurement of Fertility: Abridged life tables: Concept and construction of abridged life tables by Reed-Merrell method, Greville'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)

Unit-IV

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

Unit-V

Migration and Urbanization

Migration definition, causes and Concepts and numerous types of Migration. Concepts, definitions of urban, trends and patterns of urbanization in India.

Textbooks:

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

Reference books:

- 3) Demography – Pathak


Web Links:

1. <https://youtu.be/k3lUo0XYG3E>
2. <https://youtu.be/qSUjVDbKLWQ>

CO-PO Mapping:

(1:Slight[Low];2:Moderate[Medium];3:Substantial[High] '-' :No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	2	2	2	1	2	1	3	2	3	2	1	2	2
CO2	2	1	3	2	1	2	2	3	1	3	2	2	2
CO3	1	2	2	3	3	1	2	1	2	3	2	2	1
CO4	2	2	3	2	2	2	1	2	1	2	2	1	2
CO5	2	2	1	3	2	2	2	1	2	1	2	2	2

	Government College (Autonomous) Rajahmundry	Program & Semester IIB.Sc. (V Sem) Paper-VI			
Course Code STT208	TITLE OF THE COURSE DEMOGRAPHY & VITAL STATISTICS				
Practical	Hours Allocated: 30 hrs	L	T	P	C
Pre-requisites:	Basic knowledge in Statistical functions	0	0	3	3

Objectives:

After completion of this paper the students would be able to learn Demography in various disciplines and also learn the opportunities of statistician in different fields.

Practicals-Semester-VI

1. Mortality rates
2. Age adjustment methods
3. Fertility rates
4. Migration rates
5. Life table
6. Reproduction rates

Reference 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

Virtual Lab Links:

1. <https://youtu.be/k3IUo0XYG3E>
2. <https://youtu.be/qSUjVDbKLWQ>
3. <https://youtu.be/8DaOIjuF4BY>

Government College [A] Rajamahendravaram
CBCS SYLLABUS (Semester Wise) 2022-23

III B.Sc Statistics/Semester-V

DEMOGRAPHY & VITAL STATISTICS-VI-B1

MODEL QUESTION PAPER (THEORY)

Time: 2 1/2 hrs

Max Marks: 50

SECTION-A

Answer Any FIVE questions. All questions carry equal marks.

5x 4 = 20M


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 Any THREE questions. All questions carry equal marks.

3x 10= 30M

- 9A. Derive the Chandra Sekharan-Deming Formula
(OR)
9B. Explain the sources of collecting data in Vital Statistics
- 10A. Explain the Various Mortality Rates
(OR)
10B. Explain the Uses of Myer and UN indices
- 11A. Explain about the measurement of population growth
(OR)
11B. Explain types of migration

	Government College (Autonomous) Rajahmundry	Program & Semester III B.Sc. (V Sem) Paper-VII			
Course Code STT209	TITLE OF THE COURSE QUALITY & RELIABILITY				
Theory	Hours Allocated: 30 hrs	L	T	P	C
Pre-requisites:	Basic knowledge in Statistical functions	0	4	3	3

Objectives:

After completion of this paper the students would be able to learn the statistical quality part of statistics in various disciplines and also learn the opportunities of statistician in different fields.

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	Students would be able to learn about basics of SQC
CO2	Students would be able to know concepts of Variable charts
CO3	Students would be able to know about Attribute charts
CO4	Students must be able to know about Sampling plans
CO5	Students would be able to learn about reliability

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
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Syllabus:

Unit-I

SQC: Importance of SQC in industry. Statistical basis of Stewart control charts, uses of control charts, Interpretation of control charts, control limits, Natural tolerance limits and specification limits.

Unit-II

Variable control chart: Construction of control charts for variables (mean, range and standard deviation) and attribute control charts p, np, and c- charts (with fixed and varying sample sizes). Process capability index. Concept of Six sigma and its importance

Unit-III

Acceptance sampling plans: Producers risk and consumer's risk. Concept of AQL and LTPD.

Unit-IV

Sampling Plans: Single and Double sampling plans, OC and ASN functions. Design of Single and double sampling plans for attributes using Binomial.

Unit-V

Reliability: Introduction failure rates, Hazard function, estimation of reliability, exponential distribution as life model, its memory less property. System reliability - series, parallel and k out of N systems and their reliabilities.

Textbooks:

1. B.A/B.Sc III year paper-IV Statistics- Applied Statistics- Telugu Academy by Prof K. Srinivasa Rao, Dr. D. Giri, Dr A. Anand, Dr V. Papaiah Sastry.
2. Fundamentals of Applied Statistics: VK Kapoor and SC Gupta
3. B.A/B.Sc Statistics Quality control & Reliability, Kalyani Publishers by D.V.L.N. Jogiraju, C. Srikala and L.P. Raj Kumar.

Reference books:

- 4) R.C. Gupta: Statistical Quality Control


Web Links:

1. <https://youtu.be/k3IUo0XYG3E>
2. <https://youtu.be/qSUjVDbKLWQ>

CO-PO Mapping:

(1:Slight[Low]; 2:Moderate[Medium]; 3:Substantial[High] '-':No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	2	2	2	1	2	1	3	2	3	2	1	2	2
CO2	2	1	3	2	1	2	2	3	1	3	2	2	2
CO3	1	2	2	3	3	1	2	1	2	3	2	2	1
CO4	2	2	3	2	2	2	1	2	1	2	2	1	2
CO5	2	2	1	3	2	2	2	1	2	1	2	2	2

	Government College (Autonomous) Rajahmundry	Program & Semester IIB.Sc. (V Sem) Paper-VII			
Course Code STT209	TITLE OF THE COURSE QUALITY & RELIABILITY				
Practical	Hours Allocated: 30 hrs	L	T	P	C
Pre-requisites:	Basic knowledge in Statistical functions	0	0	3	3

Objectives:

After completion of this paper the students would be able to learn operation research in various disciplines and also learn the opportunities of statistician in different fields.

Practical's- Semester-V (Paper-VI)

1. Construction of X, R Charts
2. Construction of p chart- fixed sample size
3. Construction of np-chart
4. Construction of C-chart
5. MS-Excel methods for the serial numbers 1
6. MS-Excel methods for the serial numbers 2 to 4.

Reference books:

1. B.A/B.Sc III year paper-IV Statistics- Applied Statistics- Telugu Academy by Prof K. Srinivasa Rao, Dr. D. Giri, Dr A. Anand, Dr V. Papaiah Sastry.
2. Fundamentals of Applied Statistics: VK Kapoor and SC Gupta
3. B.A/B.Sc Statistics Quality control & Reliability, Kalyani Publishers by D.V.L.N. Jogiraju, C. Srikala and L.P. Raj Kumar.

Virtual Lab Links:

1. <https://youtu.be/k3lUo0XYG3E>
2. <https://youtu.be/qSUjVDbKLWQ>
3. <https://youtu.be/8DaOIjuF4BY>

GOVERNMENT COLLEGE (A) RAJAMAHENDRAVARAM
CBCS SYLLABUS (Semester Wise)2022-23
III B.Sc. Statistics (SemesterV)
(With Mathematics Combination)
Quality & Reliability paper-VI -B2
MODEL QUESTION PAPER (THEORY)

Time: 2 1/2hrs.

Max Marks: 50

SECTION-A

Answer any FIVE questions.

5 x 4=20M

- 1. What are 3 sigma limits? Give their importance in S.Q.C**
- 2. Discuss about Process control and Product control**
- 3. Explain the construction of C chart**
- 4. Explain about Acceptance Sampling.**
- 5 Explain Producer's Risk and Consumer's Risk.**
- 6 Explain Bath Tub Curve**
- 7 Explain Hazard function.**
- 8 Explain Reliability function**

SECTION-B

Answer THREE questions

3 x 10=30M

9A. Define SQC? Explain its usage in industry.

(OR)

9B. Explain Six-Sigma and their importance in industry

10A. Explain the construction of X and R charts.


(OR)

10B. What are SSP and DSP? Write their merits demerits

11A. Define O.C. and A.S.N functions with respect to single sampling plan for Attributes.

(OR)

11B. Explain the method of system reliability in series configuration

	Government College (Autonomous) Rajahmundry	Program & Semester III B.Sc. (V Sem) Paper-VI			
Course Code STT210	TITLE OF THE COURSE REGRESSION ANALYSIS				
Theory	Hours Allocated: 30 hrs	L	T	P	C
Pre-requisites:	Basic knowledge in Statistical functions	0	4	3	3

Objectives:

1. After completion of this paper the students would be able to learn the applied part of statistics in various disciplines and also learn the opportunities of statistician in different fields.

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	Students would be able to learn about Regression analysis
CO2	Students would be able to know concepts of Types of regression
CO3	Students would be able to know about measures of multiple regression
CO4	Students must be able to know about testing of hypothesis
CO5	Students would able to learn Multicollinearity

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
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Syllabus:

UNIT - 1

Simple Regression model: Description of data model Estimation and test of hypotheses Index of fit Predicted values and standard errors Evaluation of fit Analysis of residuals

UNIT-2

Simple Regression model: Effect of outliers in simple linear regression Model adequacy and residual plots Deletion of data points Transformation of variables transformation to stabilize variance Removal of heteroscedasticity Principle of weighted least squares

UNIT-3

Multiple regression model: Description of data model Properties of least square estimators Predicted values and standard errors Multiple correlation coefficient - Selection of variables Forward selection procedure Backward elimination procedure Stepwise method (algorithm only).

UNIT 4

Test of hypothesis on the linear model, Assumption about the explanatory variable Testing a subset of regression coefficients equal to zero. Testing of equality of regression coefficients.

Unit 5

Multicollinearity and its effects on inference and forecasting Detection of multicollinearity Searching of linear functions of regression coefficients Method of overcoming multicollinearity problem, Ridge method.

Books for Reference:

Johnston J.(1984): Econometric Methods

S.Chatterjee and B.Price(1977):Regression Analysis by Example, John Wiley & Sons, New York. Chapter 1, 2, 3 and relevant portions in chapters 4, 5, 6, 7, 8, 9 N.R.
Draper & H.Smith(1981), Applied Regression Analysis, Second Edition

Textbooks:

Johnston J.(1984): Econometric Methods

S.Chatterjee and B.Price(1977):Regression Analysis by Example, John Wiley & Sons, New York. Chapter 1, 2, 3 and relevant portions in chapters 4, 5, 6, 7, 8, 9 N.R.
Draper & H.Smith(1981), Applied Regression Analysis, Second Edition

Reference books:


Web Links:

1. <https://youtu.be/k3IUo0XYG3E>
2. <https://youtu.be/gSUjVDbKLWQ>

CO-PO Mapping:

(1:Slight[Low];2:Moderate[Medium];3:Substantial[High] '-' :No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	2	2	2	1	2	1	3	2	3	2	1	2	2
CO2	2	1	3	2	1	2	2	3	1	3	2	2	2
CO3	1	2	2	3	3	1	2	1	2	3	2	2	1
CO4	2	2	3	2	2	2	1	2	1	2	2	1	2
CO5	2	2	1	3	2	2	2	1	2	1	2	2	2

	Government College (Autonomous) Rajahmundry	Program & Semester III B.Sc. (V Sem) Paper-VI			
Course Code STT210	TITLE OF THE COURSE REGRESSION ANALYSIS				
Practical	Hours Allocated: 30 hrs	L	T	P	C
Pre-requisites:	Basic knowledge in Statistical functions	0	0	3	3

Objectives:

After completion of this paper the students would be able to learn Regression analysis and also learn the opportunities of statistician in different fields.

Practical's Semester-IV

Conduct any 6 (MS-Excel is compulsory)

Practicals-Semester-VI

1. Regressions
2. Simple Regression
3. Multiple Regression
4. Hypothesis
5. Multicollinearity-1
6. Multicollinearity-2

Reference 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,

Virtual Lab Links:

1. <https://youtu.be/k3IUo0XYG3E>
2. <https://youtu.be/qSUjVDbKLWQ>
3. <https://youtu.be/8DaOIjuF4BY>

Government College [A] Rajamahendravaram

CBCS SYLLABUS (Semester Wise) 2022-23

III B.Sc. Statistics/Semester-V

(With Mathematics Combination)

REGRESSION ANALYSIS Paper –VI –C1

MODEL QUESTION PAPER THEORY

Time: 2 1/2 hrs.

Max Marks: 50

SECTION-A

Answer Any FIVE of the following questions.

5 x 4=

20M

1. Explain Regression
2. Explain Simple Regression model
3. Explain Deletion of data points
4. Explain the Transformation of variables
5. Explain Least squares method
6. Give the assumptions for Regression
7. Explain about Multiple regression model
8. Explain Auto correlation

SECTION-B

Answer Any THREE following questions

3X10=30M

9A. Explain reasons for introducing error term in the model

(OR)

9B. Explain Least Squares method

10A. Describe general linear model

(OR)


10B. Define Selection of variables Forward selection procedure Backward

Elimination procedure Stepwise method

11A. Describe Ridge method

(OR)

11B. Explain Multi co-Linearity

	Government College (Autonomous) Rajahmundry	Program & Semester III B.Sc. (V Sem) Paper-VII			
Course Code STT211	TITLE OF THE COURSE Forecasting Methods				
Theory	Hours Allocated: 30 hrs	L	T	P	C
Pre-requisites:	Basic knowledge in Statistical functions	0	4	3	3

Objectives:

After completion of this paper the students would be able to learn the statistical quality part of statistics in various disciplines and also learn the opportunities of statistician in different fields.

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	Students would be able to learn about basics of Forecasting
CO2	Students would be able to know concepts of smoothing methods
CO3	Students would be able to know about models of time series data
CO4	Students must be able to know about Box Jenkins models
CO5	Students would be able to learn about applications of timeseries

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
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Syllabus

Unit-I

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

Unit-II

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

Unit-III

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

Unit –IV

BOX-Jennings Models: Identification, Estimation and diagnostic checking

For the models, Simulation and Monte Carlo Methods

Unit-V

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

Textbooks:

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

Reference books:

- 4) Montgomery, DC and Johnson L.A(1977) Forecasting and Time Series Analysis


Web Links:

1. <https://youtu.be/k3IUo0XYG3E>
2. <https://youtu.be/qSUjVDbKLWQ>

CO-PO Mapping:

(1:Slight[Low]; 2:Moderate[Medium]; 3:Substantial[High] '-' :No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	2	2	2	1	2	1	3	2	3	2	1	2	2
CO2	2	1	3	2	1	2	2	3	1	3	2	2	2
CO3	1	2	2	3	3	1	2	1	2	3	2	2	1
CO4	2	2	3	2	2	2	1	2	1	2	2	1	2
CO5	2	2	1	3	2	2	2	1	2	1	2	2	2

	Government College (Autonomous) Rajahmundry	Program & Semester IIB.Sc. (V Sem) Paper-VII			
Course Code STT211	TITLE OF THE COURSE Forecasting Methods				
Practical	Hours Allocated: 30 hrs	L	T	P	C
Pre-requisites:	Basic knowledge in Statistical functions	0	0	3	3

Objectives:

After completion of this paper the students would be able to learn operation research in various disciplines and also learn the opportunities of statistician in different fields.

Conduct any 6

1. Averaging methods
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 Methods

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

Virtual Lab Links:

1. <https://youtu.be/k3lUo0XYG3E>
2. <https://youtu.be/qSUjVDbKLWQ>
3. <https://youtu.be/8DaOIjuF4BY>

Government College [A] Rajamahendravaram
CBCS SYLLABUS (Semester Wise)-2022-23

III B.Sc. Statistics/Semester-V

(With Mathematics Combination)

Forecasting Methods Paper –VII-C2

MODEL QUESTION PAPER (THEORY)

Time: 2 1/2 hrs.

50

Max Marks:

SECTION-A

Answer any FIVE questions.

5 x 4= 20M


- 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 AR & ARMA**

SECTION-B

Answer any THREE questions.
30M

3 x 10 =

- 9A. Explain Exponential Methods**
(OR)
- 9B. Explain ARIMA**
- 10A Explain ratio to trend Moving averages method.**
(OR)
- 10B. Explain BOX-Jenkins model**
- 11A. Explain Auto correlation and Auto Covariance process**
(OR)
- 11B. Explain the procedure of Non-stationary in a time series.**
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	Government College (Autonomous) Rajahmundry	Program & Semester II B.Sc.			
Course Code STT191	TITLE OF THE COURSE STATISTICAL TOOLS FOR RESEARCH METHODOLOGY				
Practical	Hours Allocated: 30 hrs	L	T	P	C
Pre-requisites:	Basic knowledge in statistics	0	4	3	3

Objectives:

The objective of the paper is to serve the graduate, Post graduate students, research scholars and all disciplines of various colleges/universities and all those who are interested in doing research studies of one part or the other

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	Students would be able to learn about research
CO2	Students would be able to learn about research problem
CO3	Students would be to learn Research design
CO4	Students would be able to data analysis
CO5	Students would be to statistical tests

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
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Syllabus:

Unit – I - Research methodology-An Introduction:

Meaning of Research, Objectives of Research, Types of Research, Research Approaches, Significance of research, Research Methods Versus Methodology, Research and Scientific method, Research Process, Criteria of good Research, Problems encountered by Researchers in India.

Unit-II -Defining the Research Problem:

What is a Research Problem? Selecting the problem, Necessity and Defining the Problem, Techniques involved in defining a problem, Illustration, Conclusion Report Writing.

UNIT-III ----Data Collection and Data Management:

Sampling fundamentals and designs—Defining Population, Sample, Characteristic, sampling and non Sampling errors , Probability---Simple Random, Stratified random, Systematic Sampling.Non Probability Sampling Methods of data Collection, interview method, Observation method and questionnaire method).

UNIT-IV --- Statistical Tools:

Statistical Measures-measures of central tendency, (Mean, Median and Mode for grouped and Ungrouped data), Measures of Dispersion (Range, Mean deviation, Standard deviation Quartiles, Variance, Skewness)

UNIT-V ----Data Analysis Techniques:

Tests of Significance (Chi-square test, t-test, Paired t test, Z test), Analysis of Variance, Correlation and Regression,

Textbooks:

1. Research Methodology-Methods and Techniques—Third Edition-New Age International Publishers by C R Kothari and Gaurav Garg.
2. Research Methodology-A step by step for beginners-1st edition by Ranjit Kumar
3. **B.A/B.Sc Statistics Descriptive Statistics and Probability, Kalyani Publishers by D.V.L.N. Jogiraju, C. Srikala and L.P. Raj Kumar.**

Reference books:

4. **V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand&Sons, New Delhi**
5. **Goon AM, Gupta MK, Das Gupta B : Outlines of Statistics , Vol-II, the World Press Pvt.Ltd, Kolkata.**
6. **Hoel P.G: Introduction to mathematical statistics, Asia Publishing house.**

WebLinks:

1. <https://conjointly.com/kb/descriptive-statistics/>
2. https://en.wikipedia.org/wiki/Descriptive_statistics
3. <https://www.scribbr.com/statistics/descriptive-statistics/>
4. <https://byjus.com/maths/probability-and-statistics/>

CO-PO Mapping:

(1:Slight[Low]; 2:Moderate[Medium]; 3:Substantial[High] '-' :No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	1	2	2	1	2	2	3	2	3	2	2	2	2
CO2	2	1	2	2	1	1	2	3	1	2	2	2	2
CO3	1	1	2	3	2	1	1	2	2	2	1	2	1
CO4	2	2	3	2	2	2	2	2	2	2	2	2	2
CO5	2	2	1	1	1	2	2	1	1	1	1	1	2

**GOVERNMENT COLLEGE (A) RAJAHMUNDRY
DEPARTMENT OF STATISTICS
CERTIFICATE COURSE-2022-23
STATISTICAL TOOLS FOR RESEARCH METHODOLOGY
MODEL PAPER**


Time : 2 ½ hrs

Max Marks : 50

**Answer ALL the following questions given below :
M**

5 x 10 = 50

- 1 (a) Briefly describe the different steps involved in a Research process ?
(OR)
(b) What do you mean by research ? Explain its significance in modern times?**
- 2 (a) Describe fully the techniques of defining a research problem ?
(OR)
(b) How do you define a research problem ? Give three examples to illustrate your answer?**
- 3 (a) Define simple random Sample and explain the procedure of selecting a random sample ?
(OR)
(b) Explain Data collection?**
- 4 (a) Explain Measures of Central tendency?
(OR)
(b) Explain Measures of Dispersion?**
- 5 (a) Explain Chi-square and t tests of significance?
(OR)
(b) Discuss about Correlation and Regression?**

	Government College (Autonomous) Rajahmundry	Program & Semester I B.Sc.(SEM-II)			
Course Code STT192	TITLE OF THE COURSE ELEMENTARY STATISTICS				
Practical	Hours Allocated: 30 hrs	L	T	P	C
Pre-requisites:	Basic knowledge in statistics	0	4	3	3

Objectives:

The objective of the paper is to serve the graduate, Post graduate students, research scholars and all disciplines of various colleges/universities and all those who are interested in doing research studies of one part or the other

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	• Understand the basics of survey and reporting needs and methods
CO2	• Comprehend designing of a questionnaire
CO3	• Conduct a simple and valid survey and Collect data
CO4	Organize and interpret data and Prepare and submit report.
CO5	Learn about correlation and Regression

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
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Syllabus:

UNIT-I

Meaning, Scope and limitations of Statistics:

Collection of data: Primary and Secondary data, Classification and Tabulation, Construction of Frequency distribution. Graphical representation: Histogram, Bar, Pie and Frequency polygon

UNIT-II

Measures of Central Tendency:

Features of Good Average, Arithmetic mean, Median, Mode, Empirical relationship between Mean, Median and Mode and Skewness based on values

UNIT-III

Measures of Dispersion:

Concept of Dispersion-Range, Quartile Deviation(QD), Mean Deviation(MD), Variance, Standard Deviation(SD), relationship between QD, MD and SD
Familiarization of the concepts relating to Correlation and Regression concept.

Textbooks:

Text Books:

1. S.P.Gupta: Statistical Methods. Sultan Chand
2. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics

Reference books:

Text Books:

1. S.P.Gupta: Statistical Methods. Sultan Chand
2. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics

WebLinks:

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2. https://en.wikipedia.org/wiki/Descriptive_statistics
3. <https://www.scribbr.com/statistics/descriptive-statistics/>
4. <https://byjus.com/maths/probability-and-statistics/>

CO-PO Mapping:

(1:Slight[Low]; 2:Moderate[Medium]; 3:Substantial[High] '-':No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	1	2	2	1	2	2	3	2	3	2	2	2	2
CO2	2	1	2	2	1	1	2	3	1	2	2	2	2
CO3	1	1	2	3	2	1	1	2	2	2	1	2	1
CO4	2	2	3	2	2	2	2	2	2	2	2	2	2
CO5	2	2	1	1	1	2	2	1	1	1	1	1	2

GOVERNMENT COLLEGE (AUTONOMOUS) RAJAHMUNDRY

DEPARTMENT OF STATISTICS

UG- SKILL DEVELOPMENT COURSE-2022-23

SEMESTER-II

Common for all B.A, B.Sc, B.Com,

ELEMENTARY STATISTICS

(Model Paper)

Time- 2 Hours

Marks-50M

SECTION-A

Answer any **FOUR** questions. Each question carries 5 marks.
20Marks

4 x 5 =

1. Explain Classification of the data
2. Explain Tabulation of the data.
3. Explain Pie chart for a frequency distribution,
4. Explain Arithmetic Mean? Write its merits and demerits,
5. Explain Mode with merits and demerits
6. Explain Standard deviation

SECTION-B

Answer any **THREE** questions. Each question carries 10 marks.
30Marks

3x 10 =

7A)What is Data Collection and Discuss its methods

(OR)

7B) Explain Graphical representation

8A) Explain Measures of Central tendency

(OR)

8B) Explain concept of AM, Median, Mode and also find relationship between them ?

9A) Explain Measures of Dispersion?

(OR)

9B) Explain the concept of correlation and Regression?