Government College (Autonomous)
Rajamahendravaram

NAAC Accredited at 'A+' Grade

DEPARTMENT OF STATISTICS

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

SYLLABUS & MODEL PAPERS

2021-2022

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GOVERNMENT COLLEGE (A) RAJAMAHENDRAVARAM

DEPARTMENT OF STATISTICS

Committee Constituted for Board of Studies Meeting for the year2021-2022

Sl. No.	Name	Member
1	Dr. G.S. 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 PR Govt College((A) Kakinada	**Subject Expert**
5.	Mr. Ch. Naresh Guest faculty in Statistics Govt college(A) Rajamahendravaram	**Member**
6.	Mr. J. Naga Sriram Guest faculty in Statistics Govt College(A) Rajamahendravaram	**Member**
7.	MsK.Suneetha Guest faculty in Statistics Govt College(A) Rajamahendravaram	**Member**
8.	Student Members (i) Sk. Hafeez (ii) A. Sirisha (iii) G. Aasha Devi (iv) A Swathi	

DEPARTMENT OF STATISTICS

Approved List of Examiners/ Paper Setters

Name of the Lecturer/Reader	College	Phone.NO	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
Dr. V. RohiniKumari, Lecturer	Govt. College for Men, Ananthapur	9848236535	vrohinikumari@gmail.com
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,Lecturer	SKVT College, Rajahmundry	9949135864	dr.dvvmurthy@gmail.com
Sri K. Ashok, Lecturer	P.R.College(A),Kakinada	9848505506	sairamya285@gmail.com
Dr.B.ChndraSekharReddy,Lecturer	S R DegreeCollege, Punganur	9492376446	csr.bhumireddy@gmail.com
Dr.B.Venkata Ram, Lecturer	SSBN Degree College,Ananthapur	9440410474	gsd.atp@gmail.com
Dr.V.Munnaih, Lecturer	PVKN.GOVT.College,Chitturu	924852594	drvmstats@gmail.com
Dr.N.Madhavi,Lecturer	GOVT.College(A),Rajahmundry	9951768491	madhavi.au@gmail.com
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Dr.R.V.S.Prasad,Lecturer	P.R.R.V.S GOVT college , Vidava	9440493600	drrvsstatnlr@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
CH.Chinamambha,Lecturer	P.R.College(A),Kakinada	8328258107	
P.Annapurna,Lecturer	P.R.College(A),Kakinada	9885154367	
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 2021-2022

An online meeting was conducted for Board of Studies on 16-09-2021 from 11.00 to 12.00 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	Dr. G.S. 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 PR Govt College((A) Kakinada	Subject Expert	
5.	Mr. Ch. Naresh Guest faculty in Statistics Govt college(A) Rajamahendravaram	Member	
6.	Mr. J. Naga Sriram Guest faculty in Statistics Govt College(A) Rajamahendravaram	Member	
7.	MsK.Suneetha Guest faculty in Statistics Govt College(A) Rajamahendravaram	Member	
8.	Student Members (i) Sk. Hafeez (ii) A. Sirisha (iii) G. Aasha Devi (iv) A Swathi		

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

<u>Minutes & Resolutions of BOS dated 16-09-2021</u>

An online meeting was conducted for Board of Studies on 16-09-2021 from 11.00 to 12.00 for all the semesters under the chairmanship of Dr N.Madhavi (Lecturer-in-charge, Dept of Statistics) with the committee members.

1. It is resolved to adopt the syllabus prescribed for III,VI, V & VI Semesters for B.Sc, B.A and Actuarial Science course for the year2021-22 with slight modifications as discussed by the members and shown in the syllabus book.

2. It is resolved to adopt the syllabus prescribed by APSCHE for I and II semesters for B.Sc & B.A and Actuarial Science Programmes for the year2021-22.

3. The model papers and text books for reference was given in the syllabus for students.

4. It is resolved to introduce a new certificate course " Statistical tools for Research Methodology " from this academic year onwards and the model paper and prescribed text books for this certificate course was also prepared.

5. It is resolved to adopt Skill Course Elementary Statistics for all Second semester students of B.Sc, B.A and Actuarial Science

6. As per the APSCHE guidelines, the syllabus was prepared for four semesters.

7. 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 external evaluation at the end of each year for practical examinations.

8. 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
   5 marks for assignment
   15 marks for pedagogy techniques

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

9. It is resolved to add & delete some topics wherever necessary and the changed topics are given in the tabular form enclosed.

10. It is resolved to implement new model question papers for all semesters.

11. It is resolved to approve the list of paper setters and examiners given in the syllabus book.

12. Project guidelines were given in the syllabus and the Vivavoce marks for project was discussed by the members to allot 25 marks for Vivavoce.

13. Guest Lectures, student activities, study projects, assignments, internships are to be carried out throughout the academic year as usually.

14. As suggested by the members in the previous Board of studies meet, multiple Choice questions (Objective type) are prepared and also questions banks were prepared for all the courses in all semesters.

15. It is resolved to start M.Sc Course in coming years

Signatures of the members Present

1.

2.

3.

4.

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

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, commercelife 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.

GOVERNMENT COLLEGE (A) RAJAMAHENDRAVARAM

DEPARTMENT OF STATISTICS

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

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

S.NO	SEMESTER	TITLE OF THE PAPER	COURSE CODE
1	I	Descriptive Statistics & Probability	STT201
2	II	Probability Distributions and Statistical Methods	STT202
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	PAPER-V Sampling Techniques & Design of Experiments	STT114
7	V	Paper-VI-Quality and Reliability	STT115
8	VI	Elective-1 Applied Statistics	STT117
9	VI	Elective-II Demography and Vital Statistics	STT119
10	VI	Elective –III Forecasting Methods	STT118
11	VI	A1-Optimization Techniques	STT182
12	VI	A2-Operation Research	STT183
13	VI	A3-Project and Viva voce	STT121
14	VI	B1-Advanced Experimental Designs	STT116
15	VI	B2-Actuarial Statistics	STT122
16	VI	B3- Project and Viva voce	STT123
17	VI	C1-Regression Analysis	STT158
18	VI	C2-Decision Making Analysis	STT159
19	VI	C3- Project and Viva voce	STT160

B.Sc. SYLLABUS (SEMESTER WISE) 2021-2022							
Semester	Paper	Title of the paper					
FIRST YEAR							
Semester I	Paper-I	Descriptive Statistics and Probability	4	3	50	50	100
Semester I	Paper-I	Practical	2	2	50	0	50
Semester II	Paper-II	Probability Distributions and Statistical Methods	4	3	50	50	100
Semester II	Paper-II	Practical	2	2	50	0	50
SECOND YEAR							
Semester III	Paper-III	Inferential Statistics	4	3	50	50	100
Semester III	Paper-III	Practical	2	2	50	0	50
Semester IV	Paper-IV	Sampling Techniques & Design of Experiments	4	3	50	50	100
Semester IV	Paper-IV	Practical	2	2	50	0	50
Semester IV	Paper-V	Applied Statistics	4	3	50	50	100
Semester IV	Paper-V	Practical	2	2	50	0	50
THIRD YEAR							
Semester V	Paper-V	Sampling Techniques & Design of Experiments	3	3	50	50	100
Semester V	Paper-V	Practical	2	2	0	50	50
Semester V	Paper-VI	Elective-1:Quality and Reliability	3	3	50	50	100
Semester V	Paper-VI	Practical	2	2	0	50	50
Semester VI	Paper-VII	Elective-I Applied Statistics	3	3	50	50	100
Semester VI	Paper-VII	Elective-II Demography & Vital Statistics	3	3	50	50	100
Semester VI	Paper-VII	Elective-III Forecasting Methods	3	3	50	50	100

	Paper-VII	**Practical**	2	2	0	50	50
Semester VI	**Cluster (A)**	**(A1)Optimization Techniques**	3	3	50	50	100
		Practical	2	2	0	50	50
		(A2) Operations Research	3	3	50	50	100
		Practical	2	2	0	50	50
		(A3) Project & Viva Voce	5	5	50	50	100
	Cluster (B)	**(B1) Testing of Hypothesis**	3	3	50	50	100
		Practical	2	2	0	50	50
		(B2) Actuarial Statistics	3	3	50	50	100
		Practical	2	2	0	50	50
		(B3)Project & Viva Voce	5	5	50	50	100
	Cluster (C)	**(C1) Regression Models**	3	3	50	50	100
		Practical	2	2	0	50	50
		(C2) Decision Making Analysis	3	3	50	50	100
		Practical	2	2	0	50	50
		(C3) Project & Viva Voce	5	5	50	50	100

	Government College (Autonomous) Rajahmundry		Program & Semester I B.Sc. (I Sem)			
Course Code STT201	**TITLE OF THE COURSE** **Descriptive Statistics & Probability**					
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	

Syllabus:

UNIT-I

Introduction to Statistics: Importance of Statistics. Scope of Statistics in different fields. 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.

UNIT-II

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

15

UNIT-III

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-IV

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-V

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

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	1	3	2	3	2	1	2	2
CO2	2	1	3	2	1	1	2	3	1	1	2	2	2
CO3	1	1	2	3	3	1	1	1	2	3	1	2	1
CO4	2	2	3	2	2	2	1	2	1	2	2	1	2
CO5	1	2	1	1	1	2	2	1	1	1	1	1	2

	Government College (Autonomous) Rajahmundry	Program & Semester I B.Sc. (I Sem)			
Course Code STT201	TITLE OF THE COURSE Descriptive Statistics & Probability				
Practical	Hours Allocated: 30 hrs	L	T	P	C
Pre-requisites:	Application of Statistical tools and techniques	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**
4. **To calculate the Probabilities and Distribution functions.**

List of Experiments/Syllabus:

(Conduct any SIX 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.**
7. **Calculation of probabilities**
8. **Bayes Problems**
9. **Random Variables Problems**
10. **Distribution function problem**

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)2021-22
Descriptive Statistics and Probability
MODEL QUESTION PAPER

Time: 2 1/2 hrs.   **Max Marks: 50**

SECTION-A

Answer any SIX questions.   **6X3= 18M**

1. Distinguish between Primary and Secondary data.
2. What is Sheppard's correction? What will be the corrections for the first four moments?
3. Write short note on Diagrams and its types?
4. Explain types of classification
5. Explain Conditional Probability
6. In a frequency distribution, the co-efficient of skewness based upon the quartiles is 0.6. If the sum of the upper and lower quartiles is 100 and median is 38, find the value of the upper and lower quartiles.
7. Explain pmf and pdf
8. Explain Booles inequality
9. Explain Kurtosis

SECTION – B

Answer Any FOUR questions.   **4 x8=32M**

10. What do you understand by collection of data? What are its objectives? Discuss different methods
11. Describe the different measures of central tendency and discuss their Merits and demerits.
12. Explain the methods of measuring skewness and kurtosis of a frequency Distribution.
13. Define the raw and central moments of a frequency distribution. Derive the Relationship between them.
14. Explain MGF and its properties.

15. 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

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

16. Explain $E(X+Y)=E(X)+E(Y)$
             $E(XY)=E(X)E(Y)$

![logo]	**Government College (Autonomous) Rajahmundry**	**Program & Semester**
Course Code STT202	**TITLE OF THE COURSE** **Probability Distributions and Statistical Methods**	**I B.Sc (II Sem)**

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 discrete and continuous distributions and their applications**
CO3	**To solve the practical examples of both continuous and discrete in their real life**
CO4	**Know about various statistical methods and their applications**
CO5	**To learn about qualitatitive data**

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

Syllabus:
Unit-I

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. Possion approximation to Binomial distribution. Hyper-geometric distribution: Definition, mean and variance

Unit-II

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

Unit-III

CORRELATION: Definition, Scatter diagram its coefficient and its properties. Scatter diagram, computation of correlation coefficient for ungrouped data. Spearman's rank correlation coefficient, properties of spearman's correlation coefficients and problems.

Unit-IV

REGRESSION AND CURVE FITTING: Simple linear regression, properties of regression coefficients. Regression lines, Concept of Correlation ratio, partial and multiple correlation coefficients, correlation verses regression and their problems.

Curve fitting: Method of least square-Fitting of linear, quadratic, Exponential and power curves and their problems.

Unit – V

ATTRIBUTES: Introduction, Nature, and consistency and mention its conditions. Independence and association of attributes, co-efficient of association and Colligation, coefficient of contingency and their problems

Textbooks:

1. V.K.Kapoor and S.C.Gupta: Fundamentals of MathematicalStatistics,Sultan

   Chand & Sons, NewDelhi.

 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. Goon AM, Gupta MK, Das Gupta B: Fundamentals of Statistics, Vol-I, the
      World Press Pvt.Ltd. Kolkata.

WebLinks:

 1. https://en.wikipedia.org/wiki/Probability_distribution
 2.
https://en.wikipedia.org/wiki/List_of_probability_distributions#Discrete_distributio

CO-POMapping:

(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. (II Sem)			
Course Code **STT202**	**TITLE OF THE COURSE** **Probability Distributions and Statistical Methods**					
Practical	**Hours Allocated: 30 hrs**	**L**	**T**	**P**	**C**	
Pre-requisites:	Basic Knowledge in Probability, Distributions and methods in statistics	**0**	**0**	**3**	**2**	

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 SIX 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 straight line by the method of leastsquares
7. Fitting of parabola by the method of leastsquares
8. Fitting of power curve of the type by the method of leastsquares.
9. Fitting of exponential curve of the type and by the method of leastsquares.
10. Computation of correlation coefficient and regression lines for ungroupeddata
11. Computation of correlation coefficient, forming regression lines for groupeddata
12. Computation of Yule's coefficient ofassociation
13. Computation of Pearson's, Tcherprows coefficient ofcontingency

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

2.2https://en.wikipedia.org/wiki/List_of_probability_distributions#Discrete_distribu tions

3. https://byjus.com/maths/probability-and-statistics/

Government College [A] Rajamhendravaram

CBCS SYLLABUS (Semester Wise) 2021-22
I B.Sc Statistics/Semester-II
(With Mathematics Combination)
Probability Distributions and Statistical Methods

Time: 2 ½ hrs   **MODEL PAPER**   **Max Marks: 50**

SECTION-A

Answer any SIX questions.   **6 x 3 = 18M**

1. **Write short note on attributes**

2. **Define Poisson Distribution and its properties**

3. **Correlation vs Regression**

4. **Give the applications of Normal distribution**

5. **What are types of correlation**

6. **What are method of least Squares**

7. **What are types of association**

8. **What are Partial and Multiple coefficients**

9. **Explain tied ranks**

SECTION-B

Answer any FOUR questions   **4 x8=32M**

10. **Write about Binomial distribution and its properties**

11. **Define Normal distribution. Mention its properties**

12. **Explain about Poisson distribution. Mention its properties**

13. **Define Correlation. Explain different types of correlation and its properties**

14. **Derive the equation of regression lines of X on Y and Y on X.**

15. **Explain the method of fitting a power curve $y = ab^x$ for a given data.**

16. **Write the consistency conditions for a given data for (i) single attributes (ii) two Attributes and (iii) three attributes.**

	Government College (Autonomous) Rajahmundry	Program & Semester II B.Sc. (III Sem)			
Course Code

STT203 | TITLE OF THE COURSE
Inferential Statistics | | | | |
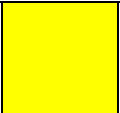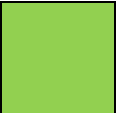| Practical | Hours Allocated: 30 hrs | L | T | P | C |
| Pre-requisites: | Basic knowledge in Sampling concept | 0 | 4 | 3 | 3 |

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	

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

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)

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 matehematical 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	0	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 matehematical 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] Rajamhendravaram

CBCS SYLLABUS (Semester Wise)2021-22
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 SIX questions. All questions carry equal marks.   **6 x 3 =18M**

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 the difference between Parametric tests, Non-parametric tests**

6. **Explain paired t- test.**

7. **Explain about sign test for one sample .**

8. **Explain chi-square test for independence of attributes.**

9. **Write the assumptions of non parametric tests**

SECTION-B

Answer any FOUR questions. All questions carry equal marks.   **4 x 8 = 32M**

10. **Explain the criteria of a good estimator.**
11. **Explain different Methods of Estimation**
12. **State and prove Neyman-Pearson's Lemma.**
13. **Explain the test procedure for (i) Testing of Mean and (ii) Equality of two means**
14. **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 = ½ and test the goodness of fit.**

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

15. **Explain the test procedure for Median test**
16. **What are the differences between parametric tests non-parametric tests?**

	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

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	

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.

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:

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	0	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/k3lUo0XYG3E

GOVERNMENT COLLEGE (A) RAJAMAHENDRAVARAM
II B.Sc. Statistics (Semester-V) 2021-22
(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 SIX questions.   6 x 3 = 18M

  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**

  9   **Discuss Sampling and non-sampling errors**

SECTION-B

Answer any FIVE questions.   4 x 8 = 32 M

  10   **What are principal steps in a sample survey.**

  11   **Derive the variance of the sample mean in SRSWOR.**

  12   **What are simple random samples? Explain the methods of selecting simple random samples.**

  13   **If the population consists of linear trend, then prove that**
         $V(Y_{st}) \leq V(Y_{sys}) \leq V(Y_n)_R$

  14   **Discuss about basic principles of experimentation**

  15   **Explain the analysis of RBD with one missing observation.**

  16   **Explain LSD and merits, demerits of LSD**

	Government College (Autonomous) Rajahmundry	Program & Semester		
Course Code **STT205**	**TITLE OF THE COURSE** **APPLIED STATISTICS**	**II B.Sc. (IV Sem) Paper-V**		
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	

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

Unit –IV

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

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

Government College [A] Rajamhendravaram
CBCS SYLLABUS (Semester Wise) 2021-22
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.   **6x 3= 18M**

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 Method of least squares in time series.

9. Explain life tables and its construction.

SECTION-B
Answer any FOUR questions. All questions carry equal marks.   **4 x 8 = 32M**

10. Explain the components of Time series

11. Link Relative Method with its merits and demerits

12. Explain the problems involved in the construction of index numbers

13. Explain the criteria of a good index number.

14. Explain the functions and organization of CSO?

15. Explain about various death rates

16. Explain National Income and its computation

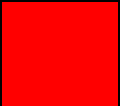|	Government College (Autonomous) Rajahmundry		Program & Semester III B.Sc. (V Sem) Paper-V			
Course Code **STT114**	**TITLE OF THE COURSE** **SAMPLING TECHNIQUES AND DESIGN OF EXPERIMENTS**					
Theory	**Hours Allocated: 30 hrs**	**L**	**T**	**P**	**C**	
Pre-requisites:	**Basic knowledge in Sampling concept**	**0**	**4**	**3**	**3**	

Objectives:

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. 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 sampling concept.**
CO2	**Students would be able to know types of sampling**
CO3	**Students would be able to know about Design of Experiments**
CO4	**Students must be able to know about ANOVA**
CO5	**Students must be able to know about CRD,RBD, and LSD**

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

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.

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:

CO-PO Mapping:

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

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

	Government College (Autonomous) Rajahmundry		Program & Semester III B.Sc.(V Sem) Paper-V		
Course Code STT114	TITLE OF THE COURSE SAMPLING TECHNIQUES AND DESIGN OF EXPERIMENTS				
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-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:

3. **Indian Official Statistics- MR Saluja**
4. **Anuvartita Sankhyaka sastram – Telugu Academy**

Virtual Lab Links:

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

GOVERNMENT COLLEGE (A) RAJAMAHENDRAVARAM
III B.Sc. Statistics (Semester-V) 2021-22
(With Mathematics Combination)
Sampling Techniques & Design of Experiments
MODEL QUESTION PAPER (THEORY)

Time: 2 1/2 hrs.   Max Marks: 50

SECTION-A

Answer any SIX questions.   6 x 3 = 18M

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

9   Discuss Sampling and non-sampling errors

SECTION-B

Answer any FIVE questions.   4 x 8 = 32 M

10   What are principal steps in a sample survey.

11   Derive the variance of the sample mean in SRSWOR.

12   What are simple random samples? Explain the methods of selecting simple
      random samples.

13   If the population consists of linear trend, then prove that
      $V(Y_{st}) \leq V(Y_{sys}) \leq V(Y_n)_R$

14   Discuss about basic principles of experimentation

15   Explain the analysis of RBD with one missing observation.

16   Explain LSD and merits, demerits of LSD

	Government College (Autonomous) Rajahmundry	Program & Semester III B.Sc. (V Sem) Paper-VI			
Course Code **STT115**	**TITLE OF THE COURSE** **QUALITY AND RELIABITY**				
Theory	**Hours Allocated: 30 hrs**	**L**	**T**	**P**	**C**
Pre-requisites:	**Basic knowledge in Statistics and its functions**	**0**	**4**	**3**	**3**

Objectives:

The aim of this paper is to understand the purpose and function of statistical quality control and also learn methods of statistical process control and learn the importance of Reliability in Quality Control.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	**Students would be able to learn about SQC**
CO2	**Students would be able to know Control charts**
CO3	**Students would be able to know about Single sampling plans and double sampling plans**
CO4	**Students must be able to know about Reliability terms**
CO5	**Students would be able to learn reliability functions**

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

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-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.**

Referencebooks:

4. **V.K.Kapoor and S.C.Gupta: Fundamentals of Applied Statistics. Sultan Chand**
5. **Parimal Mukhopadhyay: Applied Statistics. New Central Book agency.**
6. **S.P.Gupta: Statistical Methods. Sultan Chand and Sons.**

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-POMapping:

(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	1	3	2	3	2	1	2	1
CO2	2	1	2	2	1	1	2	3	1	2	2	2	2
CO3	2	1	2	3	3	1	2	2	2	3	1	1	2
CO4	2	2	3	2	2	2	1	2	1	2	2	1	2
CO5	1	2	1	1	1	2	2	1	1	1	1	1	2

	Government College (Autonomous) Rajahmundry	Program & Semester III B.Sc.(V Sem) Paper-V			
Course Code STT115	**TITLE OF THE COURSE** QUALITY AND RELIABITY				
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-V(Paper-V)
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 numbers1**
6. **MS-Excel methods for the serial numbers 2 to 4.**

Reference books:

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

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/**

GOVERNMENT COLLEGE (A) RAJAMAHENDRAVARAM
CBCS SYLLABUS (Semester Wise)2021-22
III B.Sc. Statistics (Semester-V)
(With Mathematics Combination)
Quality & Reliability
MODEL QUESTION PAPER (THEORY)

Time: 2 1/2hrs.   Max Marks: 50

SECTION-A

Answer any SIX questions.   6 x 3 =18M

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

9 Explain AQL

SECTION-B

Answer FOUR questions   4 x 8=32M

10. Define SQC? Explain its usage in industry.

11. Explain Six-Sigma and their importance in industry

12. Explain the construction of X and R charts.

13. Explain the construction of p and np charts.

14. What are SSP and DSP? Write their merits demerits

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

16. Explain the method of system reliability in series configuration

NAME OF THE PROGRAMME: B.Sc. (MSCs, MES, MSAS, MSEM)

SEMESTER: VI

TITLE OF THE PAPER: Applied Statistics

CODE OF THE PAPER: STT117

COURSE OUTCOMES:
1) **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.**
2) **Students would be able to know the functions and organization of CSO and NSSO, National income and its computation, difficulties in estimation of national income.**
3) **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.**
4) Students must be able to know about different types of Reproduction rates and abridged life tables.

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CBCS SYLLABUS (Semester Wise) 2021-22

III B.Sc Statistics/Semester-VI

Paper – VII-APPLIED STATISTICS (ELECTIVE – 1)

Total no. of hrs per week: 03	Total credits:03

Objective: **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.**

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

Unit –IV

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

Practical's Semester-VI
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**

Text Books:
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**

Government College [A] Rajamhendravaram
CBCS SYLLABUS (Semester Wise) 2021-22
III B.Sc Statistics/Semester-VI
PAPER VII-APPLIED STATISTICS (ELECTIVE -1)
MODEL QUESTION PAPER (THEORY)

Time: 2 1/2 hrs   **Max Marks: 50**

SECTION-A
Answer any SIX questions. All questions carry equal marks.   **6 x 3= 18M**

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 Method of least squares in time series.

9. Explain Sources of Vital Statistics

SECTION-B
Answer any FOUR questions. All questions carry equal marks.   **4 x 8 = 32M**

10. Explain the components of Time series

11. Link Relative Method with its merits and demerits

12. Explain the problems involved in the construction of index numbers

13. Explain the functions and organization of CSO?

14. Explain about various death rates

15. Explain life tables and its construction.

16. Explain National Income and its computation

Government College [A] Rajamhendravaram
CBCS SYLLABUS (Semester Wise) 2021-22

III B.Sc Statistics/Semester-VI

PAPER -VII DEMOGRAPHY & VITAL STATISTICS (ELECTIVE -2)
Total no. of hrs per week: 03   **Total credits:03**

Objective: After completion of this paper the student able to learn the concept related population studies and also know the applications of demography in different fields Unit-I

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.

Unit-II

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

Unit-III

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 –IV

Abridged life tables: Concept and construction of abridged life tables by Eeed-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).

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).

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**

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CBCS SYLLABUS (Semester Wise)2021-22

III B.Sc Statistics/Semester-VI

Paper - VII - DEMOGRAPHY & VITAL STATISTICS(ELECTIVE -2)
MODEL QUESTION PAPER (THEORY)

Time: 2 1/2 hrs   **Max Marks: 50**

SECTION-A
Answer Any SIX questions. All questions carry equal marks.   **6 x 3 = 18M**

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

9. Explain Demography

SECTION-B

Answer Any FOUR questions. All questions carry equal marks.   **4x 8= 32M**

10. Derive the Chandra Sekharan-Deming Formula
11. Explain the sources of collecting data in Vital Statistics
12. Explain the Various Mortality Rates
13. Explain the Uses of Myer and UN indices
14. Explain Central Mortality Rate, Force of Mortality and Life tables
15. Describe the Description and Construction of life tables
16. Describe any two methods of constructing abridged life tables
17. Explain about the measurement of population growth

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CBCS SYLLABUS (Semester Wise) 2021-22

III B.Sc. Statistics/Semester-VI

Paper VII-Forecasting Methods (Elective– 3)

Total no. of hrs. Per week: 03   **Total credits: 03**

Objective: 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

Unit-I

Smoothing Methods.   Averagingmethods, 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

Practical's Semester-VI
Conduct any 6
1. **Averagingmethods**
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**

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 Franciso**
3. **Forecasting Methods by Makridakis**
4. **Montgomery,DC and JohnsionL.A(1977)Forecasting and Time Series Analysis**

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CBCS SYLLABUS (Semester Wise)2021-22

III B.Sc. Statistics/Semester-VI

(With Mathematics Combination)

Forecasting Methods (Elective -3) Paper -VII

MODEL QUESTION PAPER (THEORY)

Time: 2 1/2 hrs.   **Max Marks: 50**

SECTION-A

Answer any SIX   questions.   **6 x 3= 18**M

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**
9. **Explain Forecasting Methods**

SECTION-B

Answer any Four questions.   **4 x 8 = 32M**

10. **Explain Exponential Methods**
11. **Explain ARIMA**
12. **Explain ratio to trend Moving averages method.**
13. **Explain BOX-Jenkins model**
14. **Explain the identification and estimation of the Box-Jenkins models.**
15. **Explain Auto correlation and Auto Covariance process**
16. **Explain the procedure of Non-stationary in a time series.**
17. **Define uses of Forecasting methods.**

NAME OF THE PROGRAMME: B.Sc. (MSCs, MES, MSAS, MSEM)
SEMESTER: VI
TITLE OF THE PAPER: Cluster-1(a) Optimization Techniques
CODE OF THE PAPER: STT182
COURSE OUTCOMES:

1) **Students must be able to know the origin and development of Operations Research, its scope and phases, advantages and disadvantages of operations research**

2) **Students must be able to know about Linear Programming problem, its formulation, solution of LPP by Graphical method, exceptional cases in graphical method.**

3) **Students must be able to understand the Simplex algorithm and solvation of problems,, Artificial Variable Technique, and Concept of degeneracy**

4) **Students must be able to understand assignment probelms**

Government College [A] Rajamhendravaram
CBCS SYLLABUS (Semester Wise) 2021-22
III B.Sc Statistics/Semester-VI
OPTIMIZATION TECHNIQUES ((Cluster-1, Paper-1) Paper -VIII

Total no. of hrs per week: 03	Total credits:03

Objective: The central objective of operations research is optimization, i.e., "to do things best under the given circumstances." This general concept has great many applications, for instance, in agricultural planning, biotechnology, data analysis, distribution of goods and resources, emergency and rescue operations, engineering systems design, environmental management, financial planning, health care management, inventory control, manpower and resource allocation, manufacturing of goods, military operations, production process control, risk management, sequencing and scheduling of tasks, telecommunications, and traffic control.

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

Text Books:
1) Operations Research by Kanthi Swaroop k.GUPTA AND ManMohan –Sultan Chand

2)Operation Research- S.D Sharma
3) Operation Research – Taha

Practicals-Semester-VI
1. **Solving LPP by Graphical method**
2. **Soving 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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CBCS SYLLABUS (Semester Wise)2021-22
III B.Sc Statistics/Semester-VI
OPTIMIZATION TECHNIQUES ((Cluster-1, Paper-1) Paper -VIII
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 FIVE questions. All questions carry equal marks.   **5 x 8 = 40M**

9. Describe the Nature and Scope of O.R
10. Solve the Following LPP by using Graphical Method

   Maximize $Z=45X_1+80X_2$

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

11. Use simplex Method to solve the following LPP

   Maximize $Z=X_1-X_2+3X_3$

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

12. Solve the Following LPP by using Big-M Method

   Minimize $Z=2X_1+3X_2$

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

13. Explain North-West Corner Rule and Least Cost Entry Methods for a given TP
14. 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

15. 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

18. Give an algorithm for n job-2 machines problem.

NAME OF THE PROGRAMME: B.Sc. (MSCs, MES, MSAS, MSEM)
SEMESTER: VI
TITLE OF THE PAPER: Cluster-1(b) Operations Research

CODE OF THE PAPER:STT183
COURSE OUTCOMES:
1) **Students must be able to know about inventory methods**
2) **Students must be able to understand the basic concepts of game theory, finding solutions for 2x2 and 2x n games.**
3) **Students would be able to learn about the Obtaining Optimal solution through for different method on inventory methods**
4) **Students would be able to know the formulation and concept of networking and its usage**

Government College [A] Rajamhendravaram
CBCS SYLLABUS (Semester Wise) 2021-22
III B.Sc Statistics/Semester-VI
(With Mathematics Combination)
OPERATION RESARCH (Cluster-1, Paper-2) Paper -IX

Total hrs per week: 03   **Total credits: 03**

Objective: The central objective of operations research is **optimization**, i.e., "to do things best under the given circumstances." This general concept has great many applications, for instance, in agricultural planning, biotechnology, data analysis, distribution of goods and resources, emergency and rescue operations, engineering systems design, environmental management, financial planning, health care management, inventory control, manpower and resource allocation, manufacturing of goods, military operations, production process control, risk management, sequencing and scheduling of tasks, telecommunications, and traffic control.

Unit-I

Game and strategies:

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

Unit-II

Inventory control-I

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

Unit-III

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, News paper boy problem

Unit-IV

Net work scheduling-I

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

Unit-V

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

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

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**

Government College [A] Rajamhendravaram
CBCS SYLLABUS (Semester Wise) 2021-22
III B.Sc Statistics/Semester-VI
(With Mathematics Combination)
OPERATION RESARCH (Cluster-1, Paper-2)   Paper -VIII
MODEL QUESTION PAPER (THEORY)

Time: 2 1/2 hrs   **Max Marks: 50**

SECTION-A

Answer Any SIX questions. All questions carry equal marks.   6 x 3= 18M

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 net work diagram.**
7. **Explain Errors in networking**
8. **Explain news paper boy problem**
9. **Define free float & total float**

SECTION-B

Answer Any FOUR questions. All questions carry equal marks.   4x 8 = 32M

10 . **Find optimal strategies for the games for which for the pay off matrices are given below also find the value of the game.**

11. **Write procedure of graphical method to solve 2Xn games**

12.   **a) Explain the cost associate with inventories**
        b) Explain probabilistic inventory models without setup cost

13.   **a) Explain the determination of EOQ with one and Two price breaks.**
        b) Explain the probabilistic inventory modal with instantaneous demand and no setup cost.

14. **Explain forward pass time computation&Backward pass time computations**

15 . **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

16.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

a) **Find a critical path and project duration**

b) **Calculate total float, Free float, independent float**

Government College [A] Rajamhendravaram

CBCS SYLLABUS (Semester Wise) 2021-22
III B.Sc Statistics/Semester-VI
(With Mathematics Combination)
ADVANCED EXPERIMENTAL DESIGHS
(Cluster-2, Paper-1) Paper –VIII

Total hrs per week: 03   **Total credits: 03**

Objective: Statistics is an inductive science in which information is extracted from sample data in order to draw inferences. This most often involves planning experiments to ensure that valid answers to questions are obtained from the sample. Statistics is a subject that deals with the collection and analysis of data and affects most aspects of modern life.

   Unit-I

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

   Unit-II

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.

Unit-III

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.

 Unit-IV

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

Unit V

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

Practicals-Semester-VI

 Conduct any Six Practical with Excel Practical

   1.Analysis of CRD and RBD with missing observation
   2.Analyss 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

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**

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CBCS SYLLABUS (Semester Wise)2021-22
III B.Sc Statistics/Semester-VI
ADVANCED EXPERIMENTAL DESIGHS
(Cluster-2, Paper-1) Paper –VIII
MODEL QUESTION PAPER (THEORY)

Time: 2 ½ hrs   **Max Marks: 50**

SECTION-A

Answer Any SIX Questions. All questions carry equal marks   **6X3=18M**

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 2^2 Experiments

6. What is 3^2 Experiment?

7. Define the Parameters in BIBD

8.Define the parameters in PBIBD

9.Explain Advanced experimental Design

SECTION-B

Answer Any FOUR questions. All questions carry equal marks.   **4 x 8 = 32M**
   10. Explain the Analysis of CRD
   11. Explain the Analysis of RBD
   12. Explain the Missing plot Technique of RBD with two missing observations
   13. Explain   the Missing plot Technique of LSD with one missing observations
   14.Explain the ANCOVA for CRD
   15. Explain the ANCOVA for RBD
   16. Explain PBIBD

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CBCS SYLLABUS (Semester Wise)2021-22
III B.Sc Statistics/Semester-VI
(With Mathematics Combination)
Actuarial statistics   (Cluster-2, Paper-2) Paper –VIII

Total hrs per week: 03   **Total credits: 03**

Unit-I

Introductory to Statistics and Insurance Applications: Discrete, Continuous and mixed probability distributions. Insurance applications, sum of random variables. Utility theory: Utility functions, expected utility criterion, types of utility function, insurance nd utility theory.

Unit-II

Principles of Premium Calculations Properties of Premium principles, examples of premium principles. Individual risk models: models for individual claims, the sum of independent claims, approximations and their applications.

Unit-III

Survival Distribution and Life Tables: Uncertainity of age at death, Survival function, time-until-death for a person, curate future lifetime, force of mortality, life tables with examples, deterministic Survivorship group, life table characteristics, assumptions for fractional age, some analytical laws of mortality.

Unit-IV

Life Insurance: Models for insurance payable at the moment of death, insurance payable at the end of the year of death nd their relationsghips. Life annuities: Continuous life annuities, discrete life annuities, life annuities with periodic payments, Premiums: Continuous an discrete premiums.

Suggested Reading:

1. **Dickson, C.M.D.(2005) : Insurance Risk And Ruin (International Series on Actuarial Science), Cambridge University Press.**
2. **Browers, N.L., Gerber, H.U. Hickman, J.C..,Jones, D.A. And Nesbitt, C.J.(1997): Actuarial Mathematics**

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CBCS SYLLABUS (Semester Wise)2021-22
III B.Sc Statistics/Semester-VI
(With Mathematics Combination)
Actuarial statistics (Cluster-2, Paper-2) Paper –VIII
MODEL QUESTION PAPER (THEORY)

Time: 2 ½ hrs   **Max Marks: 50**

SECTION-A

Answer Any SIX of the following questions.   **6x 3 = 18M**
1. Explain About Insurance Applications
2.Explain Utility Theory
3.Explain the applications of individual risk Models
4.Explain the sum of independent terms
5.Define current future life time and force of Mortality
6. Give the assumptions for Fractional Age
7. Explain about Premiums
8. Explain determine Survivorship group
9.Write short note on Actuarial statistics

SECTION-B

Answer Any FOUR questions   **4X8=32M**
10.Explain about Discrete ,Continuous and mixed probability distribution
11. Explain about the Utility Functions and its types
12.Explain about the Principles of Premium calculations and properties of
13.Define Life table ? Explain the characteristics of Life tables with Examples
14. Describe the analytical laws of Mortality
15.Explain the models for Insurance payable at the Moment of death and insurance payable at the end of year of Death
16. Explain about Discrete and continuous Life annuities

_____

Government College [A] Rajamahendravaram
CBCS SYLLABUS (Semester Wise)2021-22
III B.Sc. Statistics/Semester-VI
(With Mathematics Combination)
REGRESSION ANALYSIS (Cluster-3, Paper-1) Paper –VIII-C1
Total hrs. Per week: 03   Total credits: 03

UNIT-1

Simple Regression model: Description of data model Estimation and test of hypotheses Indexof fit Predicted values andstandarderrors   Evaluation of fit Analysis ofresiduals

UNIT-2

SimpleRegressionmodel:Effectofoutliersinsimplelinearregression   Model adequacy andresidual plots Deletion ofdatapoints   Transformation of variables transformation tostabilizevariance   Removalofhetroscedasticity   Principle of weighted leastsquares

UNIT-3

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

UNIT 4

Test of hypothesis on thelinearmodel, Assumption about the explanatory variable Testingasubsetofregressioncoefficientsequaltozero. Testing of equality of regressioncoefficients.

Unit 5

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

Books for Reference:
Johnston J.(1984): EconometricMethods

S.ChatterjeeandB.Price(1977):RegressionAnalysisbyExample,JohnWiley&Sons, NewYork.Chapter1,2,3andrelevantportionsinchapters4,5,6,7,8,9

N.R.Draper&H.Smith(1981),AppliedRegressionAnalysis,SecondEdition.

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CBCS SYLLABUS (Semester Wise)2021-22
III B.Sc. Statistics/Semester-VI
(With Mathematics Combination)
REGRESSION ANALYSIS (Cluster-3, Paper-1) Paper –VIII –C1
MODEL QUESTION PAPER THEORY

Time: 2 1/2 hrs.   **Max Marks: 50**

SECTION-A

Answer Any Six of the following questions.   **6 x 3 = 18M**
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
9.What are types of Regression curves

SECTION-B

Answer Any FOUR following questions   **4X8=32M**

 10. Explain reasons for introducing error term in the model
11.Explain Least Squares method
12. Describe general linear model
13.Define Selection of variables Forward selection procedure Backward
   Elimination procedure Stepwise method
14. Describe Ridge method
15.Explain Multi co-Linearity
16. Testing of Hypothesis for linear model

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CBCS SYLLABUS (Semester Wise)2021-22
III B.Sc. Statistics/Semester-VI
(With Mathematics Combination)
Decision Making Analysis (Cluster-3, Paper-2) Paper –VIII –C2

Total hrs. Per week: 03   **Total credits: 03**

Unit 1

DecisionProblem:Goalsandobjectives,ConflictbetweenPossiblesolutions Constraints-FeasiblesolutionsObjectivefunctionCosts and benefits,notional and criteria for optimality.

Unit 2

Steps in decision-making: Determining objective(s), identifying alternative feasible solutions, determining (expected) costs and benefits associated with a feasible solution, developing a measure of effectiveness, finding the optimal solution Sensitivityanalysisandpost-optimalityproblems, controlling asolution.

Unit 3

Structureofdecision,Development of thepay-offmeasure   Bernoulli an utility Expectedvalue, Pay-off without anaturalmeasure, Standardgamble, Strategies and statesofnature   Analysisofdecisions Pay-offmatrix Decisions under certainty, uncertainty, riskandcompetition, Optimality criteria of pessimism, optimismandregret A decision amongdecisioncriteria Laplacecriterion.

Unit 4

Sequentialdecisions-Decisiontrees,Informal analysis ofdecisiontrees-Cutting decisiontreesDecision making using expected money valueandutility. Expected profit withperfectinformation Value ofsampleinformation. Expected net gain due tosampling

Unit 5

Decision problemsinmarketing Brand-loyaltymodelBrand-share model Pricingproblem CompetitivebiddingAllocation of advertisingfunds Decision problemsin finance Investmentdecisiontrees Riskanalysis Portfolio selectionDividendpolicy

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CBCS SYLLABUS (Semester Wise) 2021-22
III B.Sc. Statistics/Semester-VI
Decision Making Analysis (Cluster-3, Paper-2)Paper –VIII–C2
MODEL QUESTION PAPER THEORY

Time: 2 1/2 hrs.   **Max Marks: 50**

SECTION-A

Answer any SIX of the following questions.   **6x 3 = 18M**

1. Explain Decision Problem
2. Explain Criteria for optimality
3.**Explain**Structureofdecision
4. Explain Riskanalysis
5. Explain **Dividendpolicy**
6. Give the controlling asolution
7. Explain Optimality criteria of pessimism
8. Explain Standardgamble
9. **Describe** developing a measure of effectiveness

SECTION-B

Answer Four the following questions   **4X8=32M**

10. **Explain Scope and objectives of Decision Making**
11. **Explain** feasiblesolutionsObjectivefunctionCosts and benefits
12. **Explain** determining costs and benefits associated with a feasible solution
13. **Define** Sequentialdecisions-Decisiontrees,Informal analysis ofdecisiontrees-
  Cutting decisiontrees

14. **Describe** Pay-offmatrix Decisions under certainty

15.Expected profit withperfectinformation Value of sampleinformation
16. **Portfolio selection Dividendpolic**

TITLE OF THE PAPER: Cluster-1(c) Project Work

CODE OF THE PAPER: **STT121**
COURSE OUTCOMES:
1) **To make the students to apply the tools and techniques in project**
2) **To test the ability of students in various concepts of subject**
3) **To understand the concepts of statistics in daily life**
4) **To know about functions in statistics**

Government College [A] Rajamahendravaram
CBCS SYLLABUS (Semester Wise) -2021-22
III B.Sc/B.A Statistics/Semester-VI
PROJECTWORK

Guidelines for the Project work:

1) Aprojectworkshallbenormallyofferedinthethirdyear(sixthsemester).
2) A project work shall be assessed for a maximum of 100 marks
3) Aprojectmaybeundertakenbyagroupofstudentsandthemaximumnumb–er of students in a team shall not exceedfive.
4) AprojectworkshallbesupervisedbyafacultymemberassignedbytheHead of theDepartment.
5) Thereshallbeaninternalexaminerfortheevaluationoftheprojectwork.
6) Aprojectworkshouldencourageastudenttointeractwiththeenduser.
7) Aprojectworkshouldbechosensuchthatthereisenoughscopetoapplyand demonstrate the statistical techniques learnt in thecourse.
8) The students should submit a report above their project work before the last working day of the concerned semester. Even if a team of students undertake the same project, the project report submitted by each member of the team should beseparate.
9) A project work report shall clearly state the problem addressed, the methodology adopted, the assumptions and the hypotheses formulated, any previousreferencestothestudyundertaken,statisticalanalysesperformed and the broad conclusion drawn.

	Government College (Autonomous) Rajahmundry		Program & Semester II B.Sc.			
Course Code STT191	TITLE OF THE COURSE STATISTICAL TOOLS FOR RESEARCH METHODOLOG SYLLABUS					
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 disciplnes 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	

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.

UNIT-III ----Research Design :

Meaning of Research Design, Need for Design, Features of good design and types, Hypothesis end testing and errors. Statistical Measures-measures of central tendency (Mean, Median and Mode for grouped and Ungrouped data), Measures of Disprsion (Range, Mean deviation, Standard deviation Quartiles, Variance, Skewness), Standard distributions normal, binomial, Poisson) probability.

UNIT-IV ----Data Collection and Data Management :

Sampling fundamentals and designs—Defining Population, Sample, Characteristic, sampling and non Sampling errors , Probability----Simple Random, Stratified random, Systematic,
Cluster and Multi-Stage Sampling. Non Probability (Convenient, Quota, Purposive and Judgement Sampling). Methods of data Collection, interview method, Observation method and questionnaire method).

UNIT-V -----Data Analysis techniques :

Tests of Significance (Chisquare test, t-test, Paired t test, Z test), Analysis of Variance, non Parametric tests (sign test, Wlcoxon, Mann-Whitney test, Krushkal-Wallis H test), Correlation and Regression, Report Writing.

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 matehematical 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

Time : 2 ½ hrs   **Max Marks : 50**

Answer ALL the following questions given below :   **5 x 10 = 50 M**

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) Explain the meaning of the following in content of Research design
   (i)   Extraneous Variables
   (ii)   Confounded relationship
   (iii)   Research hypothesis
   (iv)   Treatments

(OR)

(b) Describe some of the important research designs used in experimental hypothesis testing in research study ?

4 (a) What do you mean by Sample design ? What parts should be taken into consideration by a researcher in developing a sample design for this research project ?

(OR)

(b) Define simple random Sample and explain the procedure of selecting a random sample ?

5 (a) Explain Chi-square and t tests of significance ?

(OR)

(b) Discuss any two Non Parametric tests?

	Government College (Autonomous) Rajahmundry	Program & Semester I B.Sc.(SEM-II)			
Course Code STT	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 disciplnes 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	

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:
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

DEPARTMENT OF STATISTICS

UG- SKILL DEVELOPMENT COURSE-2020-21

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.   4 x 5 = 20Marks

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.   3x 10 = 30Marks

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?