GOVERNMENT COLLEGE(A) RAJAMAHENDRAVARAM
CBCS SYLLABUS (Semester Wise) 2017-18
I B.Sc. Statistics/Semester-I
(With Mathematics Combination)
Descriptive Statistics and Probability

Total hrs required : 60   **Total credits:03**

Unit- I
Introduction to Statistics: Concepts of primary and secondary data. Methods of collection and editing of primary data, Secondary data. Designing a questionnaire and a schedule. Measures of central tendency- Mean median, mode, Geometric mean and Harmonic mean.

Unit-II
Measures of dispersion: Range, Quartile deviation, Mean deviation and Standard deviation. Descriptive Statistics- Central and non-central moments, and their interrelationships, Sheppard's corrections for moments. Skewness and kurtosis.

Unit-III
Introduction to Probability: Basic concepts of probability, random experiments, trail, outcome, sample space, event, mutually exclusive and exhaustive events, equally likely and favorable outcomes.. Mathematical, statistical and axiomatic definitions of probabability. Conditional probability and independence of events.

Unit-IV
Probability theorems: Addition and multiplication theorems for 2 and for n events. Boole's inequality and Bayes' theorems and problems based on Baye's theorem.

Unit-V
Random Variables: Definition of random variable, discrete and continuous random variables, functions of random variables, probability mass function and probability density function Distribution function and its properties.Bivariate random variable-meaning, joint, marginal and conditional distributions, independence of random variables.

Practical's Semester-I

Conduct any 6 (Ms-excel is compulsory)
1. **Computation of mean, median and mode**
2. **Computation of Quartile deviation**
3. **Computation of mean deviation**
4. **Computation of Standard deviation.**
5. **Non-Central moments and central moments, Sheppard's corrections & Skewness based on moments and Kurtosis.**
6. **MS-Excel methods for the above Serial numbers 1, 2,3,4**

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. K.V.S. Sarma: statistics Made Simple: do it yourself on PC.   PHI

4. 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.

3. Hoel P.G: Introduction to mathematical statistics, Asia Publishing house.

4. M.JaganMohan Rao and Papa Rao: A Text book of Statistics Paper-I.

5. Sanjay Arora and Bansi Lal: New Mathematical Statistics: Satya Prakashan,New Delhi

6. Hogg.Tanis.Rao: Probability and Statistical Inference. 7th edition. Pearson

7. Sambhavyata Avadhi Siddantalu—Telugu Academy.

GOVERNMENT COLLEGE (A) RAJAMAHENDRAVARAM
CBCS SYLLABUS (Semester Wise)
I B.Sc. Statistics/Semester-I
(With Mathematics Combination)
Descriptive Statistics and Probability

MODEL QUESTION PAPER (THEORY)

Time: 3 hrs   MaxMarks: 60
(Candidates are permitted to use Non-Programmable Calculators)

SECTION-A   5 x 4= 20M
Answer any FIVE Questions. Each question carries equal marks

1. Distinguish between primary and secondary data.

2. What is Sheppard's correction? What will be the corrections for the first four moments?

3. What is meant by mutually exclusive and exhaustive events?

4. State and prove Addition theorem for two events

5. Explain the terms Probability mass function and Probability density function.

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. State and prove Boole's inequality.

8. A problem in Statistics is given to three students A, B and C, whose chances of solving it are 1/2, 3/4, and 1/4 respectively. What is the probability that the problem will be solved?

SECTION – B
Answer All the questions, each question carries Eight marks   (4 x8=32M)

9 (a) what do you understand by classification of data? What are its objectives? Discuss different methods
(Or)
(b) Describe the different measures of central tendency and discuss their merits and demerits.

10 (a) Explain the methods of measuring skewness and kurtosis of a frequency distribution.
(Or)
(b) Define the raw and central moments of a frequency distribution. Derive the relationship between them.

11 (a) Define the following terms:
    (i) Exhaustive events   (ii) Favourable events.
    (iii) Mutually exclusive events   (iv) Equally likely events

(Or)

(b) Explain the following Concepts:
    (i) Classical approach   (ii) Empirical approach
    (iii) Axiomatic approach   (iv) Conditional Probability

12 (a) State and prove addition theorem of probability for ''2" events.
A box contains 6 red, 4 white and 5 black balls. A person draws 4 balls from the box at random. Find the probability that among the balls drawn there is at least one ball of each colour.

(Or)

(b) Joint distribution of X and Y are given by $f(x,y)=4xye^{-(x^2+y^2)}; x>0, y>0$. **Test whether X and Y are independent. And also find the conditional density of X given. Y = y.**

SECTION – C

Answer all the questions, all questions carry equal marks   **(4 x 2=8M)**

13 Distinguish between a questionnaire and a schedule.

14 Define Geometric mean and Harmonic mean

15 Define skewness and kurtosis

16 Define random variable and State Baye's theorem

GOVERNMENT COLLEGE (AUTONOMOUS)
RAJAMAHENDRAVARAM
B.Sc II YEAR. STATISTICS SYLLABUS
(With Mathematics Combination)
Semester-III CBCS
Statististical Methods

Total hrs required : 60   **Total credits: 03**

Unit – I
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-II
Regression: simple linear regression, properties of regression coefficients. Regression lines, Concept of Correlation ratio, partial and multiple correlation coefficients, correlation verses regression and their problems.

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

Unit-IV
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

Unit-V
Exact Sampling distributions: Concept of Population, Parameter, random sample, statistic, sampling distribution, standard error, Statement and Properties of X^2, t, F distributions and their interrelationships.

Practical's-Semester-III

Conduct any 6 (MS-Excel is compulsory)

1. Fitting of straight line
2. Fitting of exponential curves
3. Fitting of power curve
4. Computation of correlation coefficient & Fitting of regression lines
5. Rank correlation coefficient
6. Computation of Contingency coefficients.
7. M.S-Excel methods any for the Derial Numbers 1, 2, 4, 5.

Text Books:

1. B.A/B.Sc II Year statistics-statistical methods and inference-Telugu Academy by A.Mohanrao, N.Srinivasa Rao, Dr.R.Sudhakara Reddy, Dr. T.C. Ravichandrakumar

2. K.V.S.Sarma Statistics Made simple: Do it yourself on PC, PHI.

3. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand&Sons, New Delhi.

4. 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. Outlines of statistics, Vol II: Goon Gupta, M.K.Gupta, Das Guptha B.

2. Introduction to Mathematical Statistics: Hoel P.G.

GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM
II B.Sc. Statistics (Semester-III)
(With Mathematics Combination)
Statistical Methods

MODEL QUESTION PAPER (THEORY)

Time: 3 hrs   **MaxMarks: 60**

SECTION-A

Answer any five questions from the following: **5 x 4 = 20M**

1. Derive the limits for Karl, Pearson's correlation coefficient.

2. Explain the concept of correlation ratio.

3. Explain the method of least squares

4. Explain the conditions of consistency

5. State the properties of X^2 , t and F distributions

6. Give the properties of spearman's rank correlation coefficient

7. Explain about regression

8. Explain about Standard error.

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

1 a) Explain different types of correlation and its properties Show that correlation
       coefficient is independent of change of origin and scale**.**
                            (OR)
   b) Define Rank correlation. Derive the limits for rank correlation coefficient.

2 a) Derive the equation of regression lines of X on Y and Y on X.
                            (OR)
   b) State and prove the properties of regression coefficients.

3 a) Explain the method of fitting a power curve $y = ab^x$ for a given data.
                            (OR)
   b) Explain the method of fitting of an exponential curve $y = ae^{bx}$ for a given data.

4 a) Explain Yule's coefficient of association and colligation. Establish the relation
       between them.
                            (OR)
   b) Derive the relationship between X^2 and F distributions.

14. Explain Scatter diagram

15. Define partial and multiple correlation coefficients

16. Explain the independence of two attributes

17. Explain Sampling distribution and Standard error

Sampling Techniques & Design of Experiments
Total hrs required : 50   Total Credits: 03

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.

Practicals 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.

Text Books:

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. Daroga Singh and Chowdhary: Theory and Analysis of Sample survey designs. Wiley Eastern.

4. M.R.Saluja: Indian Official Statistics. ISI publications.

5. S.P.Gupta: Statistical Methods. Sultan Chand and Sons.

6. Pratirupa Sidhanthamulu – Telugu Academy.

7. Prayoga Rachana and Visleshana – Telugu Academy.

GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

III B.A/B.Sc. Statistics (Semester-V)
(With Mathematics Combination)
Sampling Techniques & Design of Experiments-I
MODEL QUESTION PAPER (THEORY)

Time: 3 hrs   **MaxMarks: 75**

SECTION-A
Answer ALL the questions. All questions carry equal marks.   **5 x 10 = 50M**

1 a) What are principal steps in a sample survey.
                               (OR)
  b) Discuss Sampling and non-sampling errors..

2 a) Derive the variance of the sample mean in SRSWOR.
                               (OR)
  b) What are simple random samples? Explain the methods of selecting simple random samples.

3 a) Explain Stratified random sampling technique. Give its advantages and disadvantages.
.   (OR)
  b) If the population consists of linear trend, then prove that
      $$V(Y_{st}) \leq V(Y_{sys}) \leq V(Y_n)_R$$

4 a) Explain ANOVA   one way with unequal number of observations
                               (OR)
  b) Explain ANOVA two way classification

5 a) Discuss about basic principles of experimentation
                               (OR)
  b) Explain the analysis of RBD with one missing observation.

SECTION-B
Answer any five questions. All questions carry equal marks.   **5 x 3 = 15M**

6   Distinguish between census survey and sample surveys.

7   Define SRSWR and SRSWOR.

8   Explain Systematic Sampling.

9   Explain the purpose of ANOVA.

10   Explain about CRD

11   What are different types of sampling

12 Explain Proportional and optimum allocation of sample sizes in stratification.

13 Explain about LSD.

SECTION-C
Answer ALL the questions. All questions carry equal marks.   10x 1= 10M

14 Define Sample

15 Define sample frame

16 Define simple random sampling

17 What is the variance of SRSWR

18 What is meant by stratification

19   Write one advantage of systematic sampling

20   State Cochran's theorem

21 Write the assumptions of ANOVA

22 What are the basic principles that are used in CRD

23 Define the term treatment.

GOVERNMENT COLLEGE (AUTONOMOUS)
RAJAMAHENDRAVARAM
B.SC IIIYr Statistics Syllabus
(With Mathematics Combination)
Semester-V CBCS (Elective-I)
QUALITY & RELIABILITY

Total hrs required : 50   **Total Credits: 03**

Unit-I
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 importancep

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.

Practical's- Semester-V (Paper-VI)
1. Construction of X, R Charts
2. Construction of p chart- fixed sample size
3. Construction of np-chart
4. Construction of C-chart
5. MS-Excel methods for the serial numbers1
6. MS-Excel methods for the serial numbers 2 to 4.

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

Reference Books:
1. R.C. Gupta: Statistical Quality Control.

GOVERNMENT COLLEGE (AUTONOMOUS)
RAJAMAHENDRAVARAM
III B.Sc. Statistics (Semester-V)
(With Mathematics Combination)
Quality & Reliability (Elective-I)
MODEL QUESTION PAPER (THEORY)

Time: 3 hrs   **MaxMarks: 75**

SECTION-A

Answer ALL the questions. All questions carry equal marks.   **5 x 10 = 50M**

1 a) Define SQC? Explain its usage in industry.
(OR)
   b) What are the uses of Statistical Quality Control? Explain the statistical basis of
      Control chart analysis.

2 a) Explain the construction of X and R charts.
(OR)
   b) Explain the construction of p and np charts.

3 a) Explain about Acceptance Sampling Plans
(OR)
   b) Explain the concepts AQL and LTPD

4 a) What are single sampling plan and Double Sampling Plan? Write their merits and
      demerits
(OR)
   b) Define O.C. and A.S.N functions with respect to single sampling plan for
      attributes.

5 a) Explain the lack of memory property of exponential in the light of reliability
      theory?
(OR)
   b) Explain the method of system reliability in series configuration.

SECTION-B

Answer any five questions. All questions carry equal marks.   **5 x 3 = 15M**

6. What are 3 sigma limits? Give their importance in S.Q.C

7.   Discuss about process control and product control

8.   Explain the construction of c chart

9. Explain the importance of six sigma concept

10. Explain Producer's risk and consumer's risk.

11. Explain Double sampling plan

12. Explain Hazard function.

13. Explain Reliability function

SECTION-C

Answer ALL the questions. All questions carry equal marks.   **10x 1= 10M**

14. Define natural tolerance limits

15. Define chance causes

16. Write the control limits for standard deviation chart

17. Define sampling inspection

18. Write the uses of c chart

19. Define AOQ

20. Define LTPD

21. Define process capability index

22. Define Reliability

23. Define failure rate.

GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

B.SC IIIYr Statistics Syllabus
(With Mathematics Combination)
Semester-V CBCS (Elective-II)
Advanced Experimental designs

Total hrs required: 50   **Total Credits: 03**

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 3^3 factorial experiments

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

Practical's (Semester-V) Advanced: Experimental Designs
1. Analysis of CRD and RBD with missing observation.
2. Analysis of CRD and RBD with missing observation using MS Excel or using Stat disk.
3. Analysis of LSD with missing observation.
4. Analysis of LSD with missing observation using MS Excel.
5. Analysis of covariance for a one-way classification with one concomitant variable in C.R.D.
6. Analysis of covariance for a one-way classification with one concomitant variable in R.B.D.
7. Analysis of 2^2– Factorial Experiment.
8. Analysis of 2^3 – Factorial Experiment.
9. Analysis of 2^3 – Factorial Experiment using MS Excel.
10. 2^2– Factorial design - Complete Confounding.
11. 2^3 – Factorial design – Partial Confounding.

Books for Reference:

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) Limited Publishers, 1986.
3. Montgomery, D.C: *Design of Analysis of Experiments*, John Wiley.
4. Murthy, M.N., *Sampling theory and methods*, Tata McGraw Hill, New Delhi, 1967.
5. Des Raj, *Sampling Theory*, Tata McGraw Hill, New Delhi, 1976.

GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM
B.A/B.SC IIIYr Statistics Syllabus
(With Mathematics Combination)
Semester-V CBCS (Elective-II)
Advanced Experimental designs
MODEL QUESTION PAPER

Time: 3 hrs   **MaxMarks: 75**

SECTION-A
Answer ALL the questions. All questions carry equal marks.   5 x 10 = 50M

1 a) Explain the analysis of CRD

(OR)

b) Explain the analysis of RBD

2 a) Explain the Missing plot technique of RBD with two missing observations.

(OR)

b) Explain the Missing plot technique of LSD with one missing observations.

3 a) Explain the ANCOVA for CRD

(OR)

b) Explain the ANCOVA for RBD

4 a) Explain about main effects and interactions of factorial design experiment

(OR)

b) Explain 2^3 factorial design of experiment

5 a) Explain BIBD

(OR)

b) Explain PBIBD

SECTION-B
Answer any five questions. All questions carry equal marks.   5 x 3 = 15M

6   Give the advantages of CRD

7   Write two disadvantages of LSD

8   Explain missing plot technique

9   Define ANCOVA

10 Define main effects of 2^2 experiment

11 What is 3^2 experiment

12 Define the parameters in BIBD

13 Define the parameters in PBIBD

SECTION-C
Answer ALL the questions. All questions carry equal marks.   **10x 1= 10M**

14 What is the use of CRD

15 Give the layout of LSD

16 Write merits of RBD

17 On which principles RBD is based on

18 What is the use of factorial design

19   Define BIBD

20 Define PBIBD

21 What do you mean by two way classification

22 Define design

23 Define treatment