



KAKATIYA UNIVERSITY
Under Graduate Courses (Under CBCS AY: 2021-2022 onwards)
B.Sc. STATISTICS
III Year :: Semester-V

DSE-1(A)/Paper-5 (A): Applied Statistics-I
[4 HPW:: 4 Credits :: 100 Marks (External : 80, Internal : 20)]

UNIT-I

Sample Surveys: Concepts of population, sample, sampling unit, parameter, statistic, sample frame and standard error. Principal steps in sample surveys - need for sampling, census versus sample surveys, sampling and non- sampling errors, sources and treatment of non-sampling errors, advantages and limitations of sampling.

Sampling Methods: Types of sampling: Subjective, probability and mixed sampling methods. Methods of drawing random samples with and without replacement. Estimates of population mean, total, and proportion, their variances and the estimates of variances in Simple Random Sampling With and Without Replacement

UNIT-II

Estimates of population mean, population total, and population proportion, their variances and the estimates of variances in methods of: (i) Stratified Random Sampling with Proportional and Neyman allocation (ii) Systematic Sampling when $N = nk$, Comparison of relative efficiencies, Advantages and disadvantages of SRS, Stratified and Systematic sampling methods.

UNIT-III

Time Series: Time Series and its components with illustrations, additive, multiplicative and mixed models. Determination of trend by least squares and moving average methods. Growth curves and their fitting with reference to Modified exponential, Gompertz and Logistic curves. Determination of seasonal indices by Ratio to moving average, ratio to trend and link relative methods.

UNIT-IV

Statistical Quality Control: Importance of SQC in industry, Dimensions of quality, Statistical basis of Shewart control charts. Construction of control charts for variables: mean, range and standard deviation, Construction of control charts for attributes: p, np with fixed and varying sample sizes and their interpretation, c and u charts with fixed and varying sample sizes and their interpretation.

References:

1. V. K. Kapoor and S. C. Gupta: Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
2. Sanjay Arora and Bansilal :New Mathematical Statistics, Satya Prakashan , New Delhi
3. Hogg and Craig : Introduction to Mathematical statistics, Prentice Hall
4. Parimal Mukhopadhyay : Mathematical Statistics, New Central Book agency.
5. Anuvartita Sankhyaka Sastram , Telugu Academy.



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Under Graduate Courses (Under CBCS AY: 2021-2022 onwards)
B.Sc. STATISTICS
III Year:: Semester-V

Practical-5 (A) : Applied Statistics - I
[With 3 HPW, Credits 1 and 25 Marks]

Practical (using R-Software and MS- Excel)

R- Software : Overview of R, R data types and objects, reading and writing data, sub setting R Objects, Essentials of the R Language, Running R, Packages in R, Variable names and assignment, Operators, Integers, Factors, Logical operations. Operations of Scalars, Vectors, Lists, Arrays, Matrices, Data Frames. Control structures, Functions.

1. Data Visualization using R - Frequency polygons and curves, Ogives, Histogram using R.
2. Data Visualization using R - Bar diagrams (simple, compound, percentage and multiple) and Pie diagram (single and multiple) using R.
3. Computation of Descriptive Statistics using R (Measures of Central tendencies and Dispersion, Moments, Skewness and Kurtosis) using R.
4. Computation of expected frequencies for Binomial, Poisson, Normal and Exponential distributions using R.
5. Computation of Karl Pearson's coefficient of correlation and rank correlation using R.
6. Computation of partial and multiple correlations using R.
7. Time series Analysis: Computation of Secular trend by least squares and moving averages methods using R and MS-Excel.
8. Computation of Seasonal variations by Ratio to moving averages, Ratio to trend and Link Relatives methods using R and MS-Excel.
9. Construction of control charts for variables (\bar{x} , R and σ - charts) using R and MS – Excel.
10. Construction of control charts for attributes (p, np with fixed and varying sample size, C and u charts) using R and MS- Excel.



DSE-1(B)/Paper- 5 (B): Analytical Statistics-I
[4 HPW :: 4 Credits :: 100 Marks (External : 80, Internal : 20)]

UNIT-I

Sample Surveys : Principal steps in sample surveys, census versus sample surveys, sampling and non- sampling errors, advantages and limitations of sampling.

Sampling Methods: Types of sampling : Subjective, Quota, probability and mixed sampling methods. Methods of drawing random samples with and without replacement. Estimates of population mean and total, their variances and the estimates of variances in Simple Random Sampling With and Without Replacement, Stratified Random Sampling with Proportional and Neyman optimum allocation and Systematic Sampling when $N = nk$.

UNIT-II

Time Series: Time series and its components with illustrations, additive, multiplicative and mixed models. Determination of trend by least squares and moving average methods. Growth curves and their fitting with reference to Modified exponential, Gompertz and Logistic curves. Determination of seasonal indices by Ratio to moving average, ratio to trend and link relative methods.

UNIT-III

Statistical Quality Control : Importance of SQC in industry. Dimensions of quality, Statistical basis of Shewart control charts. Construction of control charts for variables (mean, range and standard deviation) and attributes (p, np, c and u- charts with fixed and varying sample sizes). Interpretation of control charts.

UNIT-IV

Analysis of Variance and Design of Experiments: Concept of Gauss-Markov linear model with examples, statement of Cochran's theorem, ANOVA , one-way, two-way classifications with one observation per cell, Statistical analysis, Importance and applications of design of experiments, Principles of experimentation, Analysis of Completely randomized Design (C.R.D), Randomized Block Design (R.B.D) and Latin Square design (LSD) including one missing observation.

References:

1. S.C.Gupta and V.K.Kapoor: Fundamentals of Applied Statistics, Sultan Chand
2. B. L. Agarwal : Basic Statistics, New Age publications.
3. S. P. Gupta : Statistical Methods. Sultan Chand and Sons.
4. Parimal Mukhopadhyay : Applied Statistics, New Central Book agency.
5. Daroga Singh and Chowdhary : Theory and Analysis of Sample survey designs. Wiley Eastern.
6. M. R. Saluja : Indian Official Statistics. ISI publications.



Practical - 5 (B): Analytical Statistics – I
[With 3 HPW, Credits 1 and 25 Marks]

Practical (using R-Software)

R- Software : Overview of R, R data types and objects, reading and writing data, sub setting R Objects, Essentials of the R Language, Running R, Packages in R, Variable names and assignment, Operators, Integers, Factors, Logical operations. Operations of Scalars, Vectors, Lists, Arrays, Matrices, Data Frames. Control structures, Functions.

1. Data Visualization using R - Frequency polygons and curves, Ogives, Histogram.
2. Data Visualization using R - Bar diagrams (simple, compound, percentage and multiple) and Pie diagram (single and multiple).
3. Computation of Descriptive Statistics using R (Measures of Central tendencies and Dispersion, Moments, Skewness and Kurtosis).
4. Computation of expected frequencies for Binomial, Poisson using R.
5. Computation of expected frequencies of Normal and Exponential distributions using R.
6. Computation of Karl Pearson's coefficient of correlation and rank correlation using R.
7. Computation of partial and multiple correlations using R.
8. Analysis of Variance for one way and two way classified data using R.
9. Analysis of Variance for CRD and RBD two way classified data using R.
10. Time series Analysis: Computation of Secular trend by least squares and moving averages methods using R.
11. Computation of Seasonal variations by Ratio to moving averages, Ratio to trend and Link Relatives methods using R.
12. Construction of control charts for variables (\bar{x} , \mathbf{R} and σ - charts) using R.
13. Construction of control charts for attributes (p, np with fixed and varying sample size, C and u charts) using R.

Question Papers Pattern

(A) Final Examination:

KAKATIYA UNIVERSITY
B.Sc. (STATISTICS)
Theory Question Paper Pattern
Academic Years: 2019-2022

Time: 3 hours]

[Max. Marks: 80

Section - A

Answer ALL questions. All questions carry equal marks. (4Qx12m=48)

Q1. (a)

[OR]

From Unit-I

Q1. (b)

Q2. (a)

[OR]

From Unit-II

Q2. (b)

Q3. (a)

[OR]

From Unit-III

Q3. (b)

Q4. (a)

[OR]

From Unit-IV

Q4. (b)

Section - B

Answer any EIGHT questions. All questions carry equal marks. (8Qx4m=32)

Q5

Q6

Q7

}
}
}

From Unit-I

Q8

Q9

Q10

}
}
}

From Unit-II

Q11

Q12

Q13

}
}
}

From Unit-III

Q14

Q15

Q16

}
}
}

From Unit-IV

Practical Question Paper Pattern
Academic Years: 2019-2022

Time: 2 hours]

[Max. Marks: 25

[Practical:15, Record:5, Viva:5]

Note: Solve any THREE problems choosing at least one from each Section

Section-A (Solve Using Calculator)

Problem. 1 }
Problem. 2 } From Part-I of Question Bank
Problem. 3 }

Section - B (Solve Using Computer Programs)

Problem. 4 }
Problem. 5 } From Part-2 of Question Bank

(B) Internal Examinations:

- 1 Two Internal exams are to be conducted and best of two internal marks is considered.
- 2 First internal exam is to be conducted after completion of Unit-I & II.
- 3 Second internal exam is to be conducted after completion of Unit-III & IV.
- 4 Internal Examination duration: 1 hr 30 min.
- 5 Internal Theory QP consists of 20 marks.
- 6 10 Short questions are to be given (5Q from each of 2 Completed units).
- 7 All TEN questions are to be answered (10QX2m=20m).

Prof A Rajendra Prasad
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