



KAKATIYA UNIVERSITY  
Under Graduate Courses (Under CBCS AY: 2020-2021 onwards)  
**B.Sc. STATISTICS**  
**II Year: Semester-IV**

---

**DSC-4/Paper-4: STATISTICAL INFERENCE**

[4 HPW: 4 Credits: 100 Marks (External: 80, Internal: 20)]

**Unit-I**

**Concepts of statistical hypotheses:** Null and Alternative hypothesis, Critical region, two types of error, Level of significance and Power of a test, One and two tailed tests, test function (non-randomized and randomized), Statement and Proof of Neyman-Pearson's fundamental lemma for Randomized tests, Examples in case of Binomial, Poisson, Exponential and Normal distributions and their power of the test functions.

**Unit-II**

**Large sample tests:** Large sample tests for single sample mean, difference of means, single sample proportion, difference of proportions and difference of standard deviations. Fisher's Z-transformation for population correlation coefficient(s) and testing the same in case of one sample and two samples, Definition of "Order Statistics" and their distributions (statements only).

**Unit-III**

**Tests of significance:** Tests based on  $\chi^2$  distribution,  $\chi^2$ -test for specified variance, goodness of fit and test for independence of attributes (rxs, 2xk and 2x2 contingency tables). Tests of significance based on student's t distribution, t-test for single sample specified mean, difference of means for independent and related samples, sample correlation coefficient, F-test for equality of population variances.

**Unit-IV**

**Non-parametric tests:** Various non-parametric tests. their advantages and disadvantages, comparison with parametric tests, Measurement scale: nominal, ordinal, interval and ratio, Use of Central Limit Theorem in testing, one sample runs test, sign test and Wilcoxon-signed rank test (single and paired samples). Two independent sample tests: Median test, Wilcoxon-Mann-Whitney U-test, Wald Wolfowitz's runs test. Use of central limit theorem in testing.

**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.

\*\*\*



**KAKATIYA UNIVERSITY**  
Under Graduate Courses (Under CBCS AY: 2020-2021 onwards)  
**B.Sc. STATISTICS**  
**II Year: Semester-IV**

---

**Practical-4: STATISTICAL INFERENCE**

[3 HPW, Credits 1 and Marks 25]

**Part-A (Using Calculator)**

1. Large sample tests for mean(s), proportion(s), Standard deviation(s) and correlation coefficient.
2. Small sample tests for single mean and difference of means and correlation coefficient.
3. Paired t-test.
4. Small sample test for single and difference of variances.
5.  $\chi^2$  – test for goodness of fit and independence of attributes.
6. Nonparametric tests for two independent samples (Median test, Wilcoxon-Mann-Whitney U-test, Wald - Wolfowitz's runs test)

**Part-B (Using MS-Excel)**

7. Use of Look up and Reference functions for data analysis.
8. Creating and assigning Macros.
9. Small sample tests for mean(s), paired t-test and correlation coefficient using MS Excel.
10. Small sample test for single and difference of variances using MS Excel.
11.  $\chi^2$  – test for goodness of fit and independence of attributes using MS Excel.
12. Nonparametric tests for single and related samples (sign test and Wilcoxon signed rank test) and one sample runs test.

Note: Training shall be on establishing formulae in Excel cells and deriving the results.  
The Excel output shall be exported to MS-Word for writing inferences.

\*\*\*

## 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

\*\*\*

KAKATIYA UNIVERSITY  
B.Sc. (STATISTICS)  
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**  
**Chairperson, BOS in Statistics, KU**