**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**II B.Sc. – Statistics/Semester- III (2018-19)**

**Paper -III**

**Course: STATISTICAL METHODS &INFERENCE**

**Total Hrs. of Teaching: 52 @ 4 h / Week Total Credits: 03**

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**Objective:** In [statistics](http://en.wikipedia.org/wiki/Statistics), **statistical inference** is the process of drawing conclusions from data that are subject to random variation, for example, observational errors or sampling variation.[[1]](http://en.wikipedia.org/wiki/Statistical_inference#cite_note-Oxford-1)Initial requirements of such a system of procedures for [inference](http://en.wikipedia.org/wiki/Inference) and [induction](http://en.wikipedia.org/wiki/Inductive_reasoning) are that the system should produce reasonable answers when applied to well-defined situations and that it should be general enough to be applied across a range of situations. Inferential statistics are used to test hypotheses and make estimations using sample data.

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**Module-1 (12h)**

1. **Curve fitting*:*** Principle of least squares, straight line, parabola, power curve, exponential curves, Most Plausible Values
2. **Attributes:** *Ana*lysis of categorical data-Independence, association & partial association of attributes-Coefficient of contingency, coefficient of colligation-Problems on attributes.

**Module -2 (14h)**

1. **Correlation:** correlation coefficient & it’s properties. Bivariate data, scatter diagram, Spearman rank correlation coefficient. Correlation ratio, multiple & partial correlation.

Problems on correlation.

1. **Regression**: regression coefficient & it’s properties. Regression line of x on y & y on x correlation vs regression, problems on regression & correlation. Problems on regression.

**Module-3 (12h)**

1. **Exact sample tests**: Concepts of population, parameter, sample, statistic, sampling, sampling distribution, standard error, sample proportion.
2. **Chi square test**: Applications & properties.
3. **T-test**: Applications & properties.
4. **F-test**: applications & properties.
5. Relations between chi square, t &F tests, MGF of chi square, t & F tests, inter relation ship between t, F and Chisquare distributions.

**Module-4 (14h)**

 **Theory Estimation**

1. **Criteria of good estimator**: Concept of unbiasedness, consistency, efficiency, sufficiency with examples-Problems on binomial, poision, normal, exponential distributions.

Statement & theory of MLE & it’s properties, Method of moments, Method of variance.

Concept of interval estimation, confidence intervals.

**List of Text Books:**

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

**List of Reference Books:**

1.Goon AM,GuptaMK,Das Gupta B: Outlines of Statistics,Vol-1,the World Press Pvt,Ltd, Kolkata.

2.Hoel P.G.: Introduction to Mathematical Statistics,New Delhi.

**Model blue print for the Question Paper setter**

**STATISTICALMETHODS & INFERENCE**

**Max. Marks: 60 Time : 2 ½ Hrs.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Unit / Chapter name** |  | **Short Answer Questions** | **Essay Questions** | **Marks allotted to the Unit/Chapter** |
| **Unit – 1** |
| **Curve fitting & Attributes** |  | **1** | **2** | **25** |
| **Unit – 2** |
| **Correlation & Regression** |  | **2** | **2** | **30** |
| **Unit – 3** |
| **Exact Sample Test** |  | **2** | **2**  | **30** |
| **Unit – 4** |
| **Theory of Estimation** |  | **1** | **2** | **25** |
| **Any of the above Units (i.e., 1-4)** |
| - |  |  |  |  |
| **Total No. of Questions including choice (14)** |  | **6** | **8** | **-** |
| **Total marks allotted to all questions including choice =** | **110** |

**P.R.Government College (Autonomous), Kakinada**

**II year B.Sc., Degree Examinations - III Semester**

**Statistics Paper–III: Statistical Methods & Inference**

**Model Paper**

**Time: 2 ½ Hrs. Max. Marks: 60**

**Section – A**

 **Answer Any Four of the following questions. 4x5 = 20 M**

1. **Define Correlation and Regression ?**
2. **What is meant by principle of least squares and write the normal equations of parabola.**
3. **Define 1) standard error 2) Parameter 3) Sampling distribution**
4. **Write the properties and applications of t-test a.**
5. **Explain the criteria for good estimation ?**
6. **Write the concept of interval estimation**

 **Section – B 2x10 = 20 M**

 **Answer Any Two of the following questions.**

1. Explain principles of least square and fit a straight line ?
2. Show that Q =$ \frac{2Y}{1+Y2}$?
3. Show that correlation coefficient is independent of change of origin & scale.
4. Estimate regression lines from the following data .?

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| X | 16 | 12 | 18 | 4 | 3 | 10 | 5 | 12 |
| Y | 87 | 88 | 89 | 68 | 78 | 80 | 75 | 83 |

 **Section – C 2x10 = 20 M**

 **Answer Any Two of the following questions.**

1. Define chi square test and write it’s properties.
2. Derive PDF of F- distribution?.
3. Explain the terms (i) unbiased Estimator (ii) Consistent
4. Find the maximum likelihood estimate for the parameter λ of a poison distribution on the bases of a sample of size n.