

STATISTICAL METHODS

Credits: 4

Semester: III

Subject Code: BS23308

No. of Lecture hours: 60

Objectives:

- To acquaint students with various statistical methods and their applications in different fields.
- To cultivate statistical thinking among students
- To develop skills in handling complex problems in data analysis and research design.

Outcome: Students will be able to choose and apply an appropriate statistical analysis or modelling methods to solve problems arising in different research fields.

CO1: Calculate and interpret the correlation between two variables

CO2: Produces simple linear regression equations.

CO3: Analyse the categorical data and to study the association among them.

CO4: Understand problem of point estimation.

CO5: Obtain estimators using estimation methods like MLE and method of moments.

UNIT-I

12Hrs

1. Bivariate data, scattered diagram 2
2. Principle of least squares, fitting of a straight line, quadratic and power curves 3
3. Concept of correlation, computation of Karl Pearson's correlation coefficient for grouped data and ungrouped data and its properties 4
4. Correlation ratio, Spearman's rank Correlation coefficient, its properties. 3

UNIT-II

12Hrs

1. simple linear regression, correlation verses regression, 4
2. properties of regression coefficients 4
3. Concepts of partial and multiple correlation coefficients (only for three variables) 4

UNIT-III

12Hrs

1. Analysis of categorical data, independence and association and partial association of attributes 7
2. Various measures of association (Yule's) for two way data and coefficient of contingency (Pearson) 3
3. Coefficient of colligation 2

UNIT-IV

12Hrs

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| 1. Concepts of population, parameter, random sample, statistic, Sampling distribution and standard error | 1 |
| 2. Standard error of sample mean(s) and sample proportion(s). | 2 |
| 3. Independence of sample mean and variance in Random sampling from normal distributions Point estimation of a parameter, concept of bias and mean square error of an estimate | 2 |
| 4. Criteria of good estimator – consistency, unbiasedness, efficiency and sufficiency with examples | 7 |

UNIT-V

12Hrs

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| 1. Statement of Neyman's Factorization theorem | 3 |
| 2. Derivations of sufficient statistics in case of Binomial, Poisson, Normal and Exponential (one parameter only) distributions | 3 |
| 3. Estimation by method of moments | 3 |
| 4. Maximum likelihood (ML), statements of asymptotic properties of MLE
Concept of interval estimation. Confidence intervals of the parameters of normal population by Pivot method | 3 |