APPLIED STATISTICS

Subject Code: DS24507 **Semester: V**

Credits: 4 **No. of Lecture hours : 75**

Objective: students will be able to use their statistical skills for decision making and evaluation and assessment at different levels.

Outcomes:

CO1: Describe different components of time series data and **compare** various methods in estimating trend.

CO2: Demonstrate different growth curves and **compute** seasonal variations using various methods.

CO3: Describe multivariate data analytical tools and **model** best fit multiple linear regression for multivariate data.

CO4: Outline different discriminant analysis used for multivariate data analysis.

CO5: Use principal component analysis and factor analysis for dimensional reduction in multivariate data analysis.

UNIT - I: **15Hours**

Introduction to Time Series Analysis:

Definition of time series analysis, Uses of time series analysis, 2

Components of time series data. Decomposition of time series data. 3

Graphical representation of time series data. 3

Measurement of Trend:

Graphical method, Semi – averages method, Moving averages method. 2

Principle of least squares method – linear, 2^{nd} degree parabola, 2

kth degree polynomial, exponential and power curves. 3

UNIT - II: **15Hours**

Growth Curves:

Definition, advantages of growth curves, measurement of growth curves. 2

Modified exponential curve, Gompertz curve, Logistic curve. 5

Seasonal Variations:

Definition of seasonal variations and types. 1

Measurement of seasonal variations using: Simple averages method. 2

Ratio to moving averages method, ratio to trend method, Link relative method. 5

UNIT – III **15Hours**

Introduction to Multivariate Data:

Definition of multivariate data. 2

Diagrammatic representation of multivariate data using:

Box plots, histograms, kernel densities, scatter plots. 4

Multiple Linear Regression:

Definition of multiple linear regression, prediction of multiple linear regression. 2

Step wise regression analysis – forward and backward. 3

Performance testing: coefficient of determination, 2

Adjusted coefficient of determination, residual mean square, residual analysis. 2

UNIT – IV (No Derivations – Only theory and problems) **15Hours**

Discriminant Analysis: Definition of discriminant analysis. 3

types of discriminant analysis, assumptions, and applications. 2

Logistic Regression: Regression with binary dependent variable, 2

estimating the logistic model, assessing the goodness of fit for the estimated model.3

Testing the significance of coefficients and interpreting the coefficients. 3

Applications of logistic regression. 2

UNIT – V (No Derivations – Only theory and problems) **15Hours**

Principal Component Analysis: Definition of principal component Analysis. 3

Formulation of PCA, Uses and application of PCA. 3

Graphical representation of PCA, biplots. 3

Factor Analysis: Dimensional reduction, importance of dimensional reduction. 3

calculation of factor scores and interpretation of factor analysis. 3