ST.JOSEPH’S COLLEGE FOR WOMEN ( AUTONOMOUS ) , VISAKHAPATNAM

III SEMESTER  **MATHEMATICS** TIME:5HRS/WEEK

ST-Mi1-3201(3) **STATICAL METHODS**  MARKS:100

w.e.f.2023-2024 (AK Batch) **SYLLABUS**

**Course Objectives: To enable the students to –**

**CO1:** Apply the principle of least squares to fit various types of curves to bivariate data **(K3)**

**CO2:** Analyse bivariate frequency distributions to compute correlation coefficients and

interpret their significance **(K4)**

**CO3:** Apply the concepts of multiple and partial correlation coefficients to analyze

relationships among three variables **(K3)**

**CO4:** Analyse regression coefficients and the angle between regression lines to interpret the

relationship between variables **(K4)**

**CO5:** Apply methods to test the consistency and independence of attributes in given

Datasets **(K3)**

**Course Outcomes: At the end of the course student will be able to:**

**CO1:** fit kth degree polynomials and exponential curves to bivariate data using the principle

of least squares **(K3)**

**CO2:** analyse bivariate frequency distributions to compute and interpret correlation

Coefficients **(K4)**

**CO3:** apply multiple and partial correlation coefficients to analyze relationships among three

Variables **(K3)**

**CO4:** analyse regression coefficients and the angle between regression lines to interpret

Relationships **(K4)**

**CO5:** apply methods to test the consistency and independence of attributes in datasets **(K3)**

**Content of the Syllabus**

**UNIT – I: CURVE FITTING:** Bivariate data, Principle of least squares, fitting of kth degree polynomial. Fitting of straight line, Fitting of Second degree polynomial or parabola, fitting of family of exponential curves and power curve.

**UNIT – II: CORRELATION:**

Meaning, Types of Correlation, Measures of Correlation – Scatter diagram, Karl Pearson’s Coefficient of Correlation, Rank Correlation Coefficient (with and without ties), Properties. Bivariate frequency distribution, correlation coefficient for bivariate data and problems. Lag and Lead in correlation.

**UNIT – III: CORRELATION ANALYSIS:**

Coefficient of concurrent deviation, probable error and its properties, coefficient of determination, Concept of multiple and partial correlation coefficients (three variables only), properties and problems, intra-class correlation and correlation ratio.

ST-Mi1-3201(3) ::2::

**UNIT – IV: REGRESSION:**

Concept of Regression, Linear and Non-Linear regression. Linear Regression – Regression lines, Regression coefficients and its properties, Angle between two lines of regression. Regressions lines for bivariate data and simple problems. Correlation vs regression. Explained and Unexplained variations.

**UNIT – V: ATTRIBUTES:**

Notations, Class, Order of class frequencies, Ultimate class frequencies, Consistency of data, Conditions for consistency of data for 2 and 3 attributes only, Independence of attributes, Association of attributes and its measures, Relationship between association and colligation of attributes, Contingency table: Square contingency, Mean square contingency, Coefficient of mean square contingency, Tschuprow’s coefficient of contingency.

**PRESCRIBED TEXT BOOK:**

“Fundamentals of Mathematical Statistics” by S.C. Gupta and V.K. Kapoor

**REFERENCE BOOKS:**

1. “Introduction to Probability and Statistics” by William Mendenhall, Robert J. Beaver, and Barbara M. Beaver
2. **“Applied Multivariate Statistical Analysis” by Richard A. Johnson and Dean W. Wichern**
3. “Statistics for Business and Economics” by Paul Newbold, William L. Carlson, and Betty Thorne
4. “An Introduction to Statistical Learning with Applications in R” by Gareth James, Daniela Witten, Trevor Hastie, and Robert Tibshirani
5. “Mathematical Statistics with Applications” by Dennis Wackerly, William Mendenhall, and Richard L. Scheaffer
6. The Elements of Statistical Learning: Data Mining, Inference, and Prediction” by Trevor Hastie, Robert Tibshirani, and Jerome Friedman

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