

Semester	TWO
Course	Major
Paper Code	C1ST230212T / C1ST230212P
Paper Title	Descriptive Statistics II
No. of Credits	4
Theory / Practical /Composite	Composite
Classes per week	3 Theory and 2 Practical
Module	1

Course Outcomes

1. Remember fundamental concepts of non-linear regression, different types of correlation, association measures, and multivariate statistical techniques.
2. Understand polynomial and exponential regression models, correlation measures, contingency table analysis, and the role of multiple regression in multivariate data analysis.
3. Apply appropriate statistical methods such as rank correlation, correlation ratio, intra class correlation to analyze real datasets using statistical software.
4. Analyze relationships among variables using measures of association in contingency tables, and partial and multiple correlations in multivariate settings.
5. Evaluate the strength and significance of relationships and model adequacy using statistical measures, goodness-of-fit criteria, and interpretation of regression outputs.
6. Create statistical models and analytical reports by selecting suitable regression and correlation techniques for real-world data problems.

Syllabus

Unit/Module	Content	No. of lectures	CO mapping	Cognitive levels
<i>Unit 1</i>	Non-linear regression: Polynomial regression and correlation index. Exponential curves. Transformation to linearity: log-linear and power transformations.	5	CO1 CO2	K1 K2
<i>Unit 2</i>	Different types of correlation: Correlation ratio. Intra-class correlation. Rank correlation (Spearman's and Kendall's).	9	CO1 CO2 CO3	K1 K2 K3
<i>Unit 3</i>	Association in two way tables: 2x2 contingency table. Notion of independence & association; ideas of complete and absolute association. Yules and Cramer's measures of association. Concept of odds ratio.	10	CO2 CO4	K2 K4

	Extension to kx1 contingency table: Pearson's chi-square, Kendall's tau a & Tau b, Goodman Kruskal's gamma			
Unit 4	Multivariate Data: Least squares and multiple linear regression; multiple and partial correlation. Multiple linear regression with qualitative predictors.	15	CO1 CO2 CO4 CO5 CO6	K1 K2 K4 K5 K6

Reading/Reference list

1. Goon A.M., Gupta M.K., Dasgupta, B. (2005), Fundamentals of Statistics, Vol II, World Press, Calcutta.
2. Michael S. Lewis Beck (1993): Basic Statistics. Sage Publication.
3. James, G., Witten, D., Hastie, T. & Tibshirani, R. (2015): An Introduction to Statistical learning with applications in R (chapter 3), Springer

Evaluation

Paper Structure	Theory CIA:15 Semester Exam: 45	Practical CA: 40 Semester Exam: NA
	5 Marks Questions	15 Marks Questions
	3 out of 5	2 out of 3

CO	CO Description	Cognitive levels
CO1	Remember fundamental concepts of non-linear regression, different types of correlation, association measures, and multivariate statistical techniques.	K1
CO2	Understand polynomial and exponential regression models, correlation measures, contingency table analysis, and the role of multiple regression in multivariate data analysis	K2
CO3	Apply appropriate statistical methods such as rank correlation, correlation ratio, intra class correlation to analyze real datasets using statistical software.	K3
CO4	Analyze relationships among variables using measures of association in contingency tables, and partial and multiple correlations in multivariate settings.	K4
CO5	Evaluate the strength and significance of relationships and model adequacy using statistical measures, goodness-of-fit criteria, and interpretation of regression outputs.	K5
CO6	Create statistical models and analytical reports by selecting suitable regression and correlation techniques for real-world data problems.	K6