Semester	**FIVE**
Course	**Major**
Paper Code	**C3ST230541P**
Paper Title	**Data Analysis - I**
No. of Credits	**4**
Theory / Practical /Composite	**Practical**
Classes per week	**Unit 1: 2 periods/week** **Unit 2: 2 periods/week** **Unit 3: 2 periods/week**
Module	**1**

Course Outcomes

• **Remember** key concepts, assumptions, and terminology related to estimation, hypothesis testing, linear models, and quality control techniques.
• **Understand** the theoretical rationale behind likelihood-based methods, power functions, ANOVA/Regression models, and index numbers.
• **Apply** appropriate statistical inference, linear model techniques and quality control tools to real-world data sets and industrial problems.
• **Analyze** data using estimation methods, hypothesis tests, income distribution models, and control charts to identify patterns and infer relationships.
• **Evaluate** the effectiveness and optimality of tests, estimators, sampling plans, and control procedures using criteria such as power, OC curves, and ASN functions.
• **Create** statistical solutions by constructing tests, confidence intervals, index numbers, and models for economic, industrial, and social data analysis.

Syllabus

Content	No. of lectures	CO mapping	Cognitive levels
UNIT 1: *Statistical Inference II* 1. Problems related to methods of Estimation. 2. Construction of optimal tests in practice. 3. Problems on Power curves. 4. Problems related to Likelihood Ratio tests. 5. Construction of sequential tests for industrial problems and study the corresponding OC curve & ASN functions.	26	CO1 CO2 CO3 CO4 CO5 CO6	K1 K2 K3 K4 K5 K6
UNIT 2: *Linear Statistical Models* 1. Estimation problems in Linear Models. 2. Tests related to ANOVA, Regression, and ANCOVA models. 3. Construction simultaneous confidence intervals.	26	CO1 CO2 CO3 CO6	K1 K2 K3 K6

UNIT 3: *Economic Statistics and Statistical Quality Control* 1. Construction & Interpretation of Price & Quantity Index numbers. 2. Computation of income inequality. 3. Fitting of income distributions. 4. Construction and interpretation of control charts. 5. Implementation of sampling inspection plans.	26	CO1 CO2 CO3 CO4 CO5 CO6	K1 K2 K3 K4 K5 K6

Reading/Reference list

Same as the relevant theory papers

Evaluation

Total Marks	100
Mode of Exam	Continuous Assessment

CO	CO Description	Cognitive levels
CO1	**Remember** key concepts, assumptions, and terminology related to estimation, hypothesis testing, linear models, and quality control techniques.	K1
CO2	**Understand** the theoretical rationale behind likelihood-based methods, power functions, ANOVA/Regression models, and index numbers.	K2
CO3	**Apply** appropriate statistical inference, linear model techniques and quality control tools to real-world data sets and industrial problems.	K3
CO4	**Analyze** data using estimation methods, hypothesis tests, income distribution models, and control charts to identify patterns and infer relationships.	K4
CO5	**Evaluate** the effectiveness and optimality of tests, estimators, sampling plans, and control procedures using criteria such as power, OC curves, and ASN functions.	K5
CO6	**Create** statistical solutions by constructing tests, confidence intervals, index numbers, and models for economic, industrial, and social data analysis.	K6