Course Title: Industrial Statistics	**L**	**T**	**P**	**S**	**Open Elective**
Course Code: DOMS100OE	**2**	**x**	**x**	**x**	**Max Marks**: 50
Credits: 2					

Course Objective: To introduce the key statistical methods used in quality control, with a focus on their application in industrial processes

Course Outcomes: By the end of this course, students will be able to:

1. Apply statistical and probabilistic methods to monitor and enhance quality in industrial operations.
2. Develop and interpret control charts for process variables and product attributes.
3. Evaluate product and process quality using standard SQC tools and methods.
4. Design, analyze and compare single and double acceptance sampling plans with performance measures.

UNIT-I: Introduction to quality and dimensions of quality; Definition and objectives of quality control; Statistical quality control (SQC) and its elements; Techniques of SQC; Process control and product control; causes of variation – chance and assignable causes; Shewhart's control charts; Statistical basis of control charts; 3σ and 6σ limits and interpretation; Control charts for variables (X, R and S); Control charts for attributes (np, p and c) charts; Control chart patterns – natural and unnatural variations; Advantages and limitations of SQC.

UNIT-II: Introduction to Acceptance Sampling Plans; Types of sampling plans (Single, Double, Rectifying); Implementation and design aspects; Key terms in acceptance sampling; Operating Characteristic (OC) Curve; Producer's and Consumer's Risks; Average Outgoing Quality (AOQ) and AOQ Limit (AOQL); Average Sample Number (ASN); Differences between Single and Double Sampling.

TextBooks/ References

1. Biswas, S.(1996). Statistical Quality Control, Sampling Inspection and Reliability; New Age International Publishers.
2. Montgomery, D.C. (1985) Introduction to Statistical Quality Control; Wiley
3. Ott, E.R. (1975) Process Quality Control; McGraw hill
4. Phadke, M.S. (1989) Quality Engineering through Robust Design; Prentice Hall
5. Wetherill, G.B. (1977) Sampling Inspection and Quality Control; Halsted Press

Course Title: Time Series Analysis	**L**	**T**	**P**	**S**	**Open Elective**
Course Code: DOMS102OE	**2**	**x**	**x**	**x**	**Max Marks**: 50
Credits: 2					

Course Objectives

To equip students with fundamental knowledge of time series analysis, focusing on identification and estimation of trend and seasonal components using various statistical methods, and to develop skills for applying these techniques in real-world applications.

Course Outcomes: After the end of this course students will be able

1. Explain the basic concepts, applications, and components of time series data.
2. Estimate and analyze trends using graphical, semi-averages, and curve-fitting methods.
3. Apply moving averages and detrending techniques to isolate different components of a time series.
4. Estimate and interpret seasonal variations using standard methods such as simple averages, ratio to trend, ratio to moving average, and link relatives.

Unit-I: Introduction to times series data, application of time series from various fields, Components of a time series, Decomposition of time series. Trend: Estimation of trend by free hand curve method, method of semi averages, fitting a various mathematical curve, and growth curves.

Unit-II: Method of moving averages. Detrending. Effect of elimination of trend on other components of the time series. Seasonal Component: Estimation of seasonal component by Method of simple averages, Ratio to Trend, Ratio to moving average and Link relatives.

TextBooks/ References

1. Kendall M.G. (1976): Time Series, Charles Griffin.
2. Chatfield C. (1980): The Analysis of Time Series –An Introduction, Chapman & Hall.
3. Mukhopadhyay P. (2011): Applied Statistics, 2nd ed. Revised reprint, Books and Allied