Course Type	Course Code	Name of Course	L	T	P	Credit
DE	**NMCD532**	Industrial Statistics	3	0	0	3

Prerequisite

- Probability and Statistics.

Course Objective

To discover flaws or variations in the raw materials and the manufacturing processes in order to ensure smooth and uninterrupted production.

1. To evaluate the methods and processes of production and suggest further improvements in their functioning.
2. To study and determine the extent of quality deviation in a product during the manufacturing process and to analyze in detail the causes responsible for such deviation.
3. To undertake such steps which are helpful in achieving the desired quality of the product.

Learning Outcomes

After successfully completing the course, expected outcomes are:

1. Understand the philosophy and basic concepts of quality improvement and describe the DMAIC process (define, measure, analyze, improve, and control).
2. Students will be able to use the methods of statistical process control and able to design, use, and interpret control charts for variables and attributes.
3. Perform analysis of process capability and measurement system capability.
4. Design, use and interpret exponentially weighted moving average and moving average control charts.

Unit No.	Topics to be Covered	Contact Hours	Learning Outcome
1	Quality and quality assurance, Statistical methods in Quality Control and improvement; Methods and philosophy of Statistical Process Control, Chance and assignable causes of variation,	8	Understand the philosophy and basic concepts of quality improvement and international standards on quality management and quality assurance
2	Choice of Control Charts, Rational Subgroups, Control Charts for Variables: $\bar{X}$ and R Chart, $\bar{X}$ and S Chart; Control Chart for Attributes: Control Chart for Fraction Defectives, Control Chart for Defects, Choice between Variable and Attribute Control Charts, Shewhart Control Chart, Modified Control Charts, Process Capability Analysis- using Histogram, Probability Plot.	11	Students will be able to use the methods of statistical process control and able to design, use, and interpret control charts for variables and attributes.
3	Acceptance Sampling Plan: Single-sampling for Attributes, Operating-Characteristic (OC) curve, Double, multiple, and sequential sampling plans, Dodge-Romig sampling plan; Acceptance sampling by variables, Designing a sampling plan with a specified OC curve, sequential sampling by variables, continuous sampling plans.	11	Perform analysis of process capability and measurement system capability and learn the DMAIC process (define, measure, analyze, improve, and control).
4	Process capability Analysis, Statistical aspect of six sigma philosophy; Control charts with memory: Cumulative sum and exponentially weighted moving average charts, OC and ARL for control charts	8	Students will learn to design, use and interpret exponentially weighted moving average and moving average control charts.
5	The Taguchi Method: The Taguchi philosophy of quality, Loss functions, SN ratios, Performance measures.	4	Students will learn to measure the quality under different loss functions
Total		**42**	

Text Books

1. D.C. Montgomery (2019). Introduction to Statistical Quality Control, 8th Ed., Wiley.
2. A.J. Duncan (1986) Quality Control and Industrial Statistics, 5th Ed., Irwin., Homewood

Reference Books

1. E.G. Schilling, (1982) Acceptance Sampling in Quality Control, Marcel Dekker, New York.
2. E.L. Grant and R.S. Leavenworth (1980) Statistical Quality Control, 7th Ed., McGraw-Hill.