STA100:
Industrial Statistics, SQC AND SPC

Duration:	**6 hours Online Only**
Audience:	**Process Engineers, Research Engineers, Laboratory Personnel, Analyzer Technicians, Instrument Engineers and Supervisors.**
Prerequisites:	**None**
Course Material:	**Training slides and various statistical software products.**

Course Description and Objectives:
Train engineers, technicians and supervisors on the latest statistical tools, methods and practices. Apply statistical methods to analyze process and plant data. Understand statistical quality control, statistical process control, six sigma and related topics. Understand customer quality needs and implement monitoring and statistical methods to improve control.

Learning Outcomes:
At the end of the course, attendees will understand all practical concepts on statistics. They will be able to apply statistical principles and theory to their practical plant data and control problems. They will be able to use modern statistical tools and apply them to actual plant data. The knowledge will help directly to improve statistical control at the plant and achieve more customer satisfaction. The following topics are covered in this course:

- Analyze, interpret and present data in a meaningful way and Descriptive statistics Histograms, Pareto charts, Scatter Plots, Confidence Intervals, T-tests and F-tests. Sampling strategies, transformations, power and sample size calculations Analysis of variance (ANOVA), Non-parametric tests and Regression
- Determine when a real problem exists and if process improvements, changes are required X and mR, Xbar and R, c, u, np, p, CUSUM and EWMA charts
- Capability indices Cp, Cpk, Pp and Ppk, Time series plots, Trend analysis and Decomposition
- Moving averages and other smoothing methods Statistical hypothesis tests - equivalence testing
- One-way analysis of variance and confidence intervals showing their application to validation Problem definition, selecting responses and factors
- Scoping studies, Screening designs, Taguchi methods, fractional and full factorial designs Response surface methodology (RSM)
- Product design, semantic scales, questionnaire design Factor analysis and Principal components analysis (PCA)
- Gauge repeatability and reproducibility studies
- Gauge linearity and bias studies and attribute agreement analysis
- Estimate relationships between independent variables and dependent variables
- Understand and explain relationships among variables and use them to predict actual responses Understand product and system lifetimes. Product reliability and failure modes Manufacturer's methods to inform warranty periods
- First-time failure rates, terminal failure rates, non-repairable devices, repairable systems, test plans and the Weibull distribution.