

## Applied Data Analysis

### OBJECTIVES

This course covers the following key topics:

- Review of Control Charts in Excel
- Descriptive Statistics and Central Limit Theorem (CLT)
- Sample Size Determination
- Creating Confidence Intervals for both variables and attributes data
- Process Capability (Cp & Cpk) and Yield Studies
- Correlation and Regression techniques in Excell
- Use of ANOVA for Basic Design of Experiments

### WHO SHOULD ATTEND

This course is intended for those involved in design, test, analysis, or manufacturing who want a better understanding of advanced problem solving tools. Disciplines include Process Engineers, Quality Engineers, Manufacturing Engineers, Electronic Engineers, Scientists and Researchers, Managers and Directors.

### COURSE OVERVIEW

This course provides a useful set of statistical tools for both manufacturing operations, and analytical tools for Research. Many Excel examples are provided so that participants walk away with hands-on statistical techniques for key product and process parameters. The course provides review of Central Limit Theorem and Control Charts, but quickly jumps into descriptive statistics and confidence interval generation. Course includes design and analysis of test data, plus sample size determination.

## OUTLINE

### INTRODUCTION: LEARNING OBJECTIVES

#### REVIEW - CONTROL CHARTS IN EXCEL

- Variable Controls
- Attribute Controls
- Pareto Charts

#### DESCRIPTIVE STATISTICS

- Measure of Central Tendency
- Measures of Variation
- Variance and Co-Variance (CV)

#### CREATING CONFIDENCE INTERVALS (CI) IN EXCEL

- CI for Variable Data (Mean)
- CI for Attributes Data (Proportion)
- Sample Size Determination for Means and Proportions

#### PROCESS CAPABILITY STUDIES

- Transforming Control Data to Capability
- Interpretation of Cp and Cpk
- Yield Determination
- Attribute Proportional Testing

#### HYPOTHESIS TESTING METHOD IN EXCEL

- Hypothesis Testing Overview
- Yield Determination using "Z" statistical tests
- Testing means from a population to a sample - z test
- Tests for Paired Observations and "t" Test for Two Populations
- Attribute Test for Two Proportions

#### CORRELATION AND REGRESSION IN EXCEL

- Overview
- Excel Exercise
- Fitting Non-Linear
- Interpretation

#### USING ANOVA FOR BASIC DESIGN OF EXPERIMENTS

- Use Excel to test two sample variances (F Test)
- Steps in Designing an Experiment
- One-Way Single Factor ANOVA (2 or more variables)
- Two-Way ANOVA (2 or more variables at 2 or more levels)

#### APPENDIX

- Terms and Definitions
- Formula Summary