



Engineering Statistics & Data Analysis

(24 hours)

Course Description:

ESDA is specifically designed to meet the analytical needs of those individuals working within a variety of industries. Areas of focus include: JMP basics, analysis of data for basic engineering and scientific applications including statistics, distribution analysis, capability assessment, variation analysis, comparison tests, sample size selection, hypothesis testing, confidence intervals and multiple factor modeling.

Audience:

Course is for engineers, scientists, and quality professionals who actively work on all aspects of discovery, product and process development where the goal is to characterize, optimize and improve product and process performance.

Software: JMP

Prerequisites: None

Course Objectives:

Upon completion of the course the participants will be able to:

1. Use data to solve engineering and scientific problems
2. Understand the ideas associated with sampling and data collection
3. Demonstrate the ability to evaluate distributions
4. Select appropriate sample sizes for performance evaluation
5. Conduct comparative tests using data
6. Use regression techniques in order to analyze the results and make process/product improvements
7. Select appropriate analysis technique based on type of data
8. Apply JMP to data analysis problems

Course Outline:

Introduction to the Analytical Software (JMP)

Table commands
Column commands
Row commands
Subset commands
Saving Scripts, Journals data and Projects

Statistics Foundations & Distribution Analysis

Measures of center and spread
Standard error and central limit theorem
Normal distribution, t distribution and confidence intervals
Test for Normality
Individuals and tolerance intervals (normal)
Process capability (normal) and non-normal distribution fitting
Nonnormal distribution fitting and process capability



Nominal X, Continuous Y

Contour plots, Components of Variance, REML and POV
Sample size for the mean and standard deviation
t test - one sample, two sample
Test for differences in variances
One-way ANOVA and F test
N-way ANOVA
Nonparametric data analysis (optional)

Continuous X, Continuous Y

Simple linear regression, correlation
Multiple Regression and ANCOVA

Nominal X, Nominal Y

Mean and Sigma for proportion defective
Sample size and statistical tests for proportion defective
Mean and Sigma for defect per unit
Chi-square test for defects and proportion defective
Pareto graphs and cross tabs analysis

Continuous X, Nominal Y and Partition

Logistic regression
Nominal logistic regression (optional)
Recursive partitioning

Nonlinear Modeling

Nonlinear modeling