



Engineering Statistics & Data Analysis (ESDA)

(3 days)

ESDA

Course Description

This course is specifically designed to meet the analytical needs of those individuals working within FDA regulated industries. Areas of focus are; 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. The course requires 24 hours of instruction.

Attendees

This course is required for all scientists, engineers 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.

Prerequisites

There are no prerequisites for this course.

Course Objectives

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 data and make process/product improvements.
7. Select appropriate analysis technique based on type of data.
8. Apply JMP to data analysis problems.

Detailed Course Outline

Section I Introduction to JMP

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

Section II 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)
- Nonnormal distribution fitting and process capability



Section III Nominal X, Continuous Y

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

Section IV Continuous X, Continuous Y

Simple linear regression, correlation
Multiple regression
ANCOVA

Section V 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

Section VI Continuous X, Nominal Y and Partition

Logistic regression
Nominal logistic regression (optional)
Recursive partitioning

Section VII Nonlinear Modeling

Nonlinear modeling, growth and EC50 determination