



Design of Experiments II

System Optimization

Course Overview

As the requirements of new products and processes to "perform" continue to increase, the market demands their development in ever shorter cycles. The pressure on experimenters to discover the optimal conditions of the process, product, or test method they develop has never been greater. With the help of PC-based software, experimenters now have a powerful set of Design of Experiments tools to aid them in their pursuit of optimal system performance. Picking up where the DOE I course left off, the focus of this 16-hour course is on powerful and practical DOE methods that allow experimenters to successfully identify the conditions of multiple factors that achieve the multiple performance features of the system.

Course Content

Day 1

- Review of Design of Experiments I
 - Generic Strategy of Experimentation
 - Methods for Reducing Uncertainty in Experimental Results
 - Common Multi-factor Designs
- Data Issues in the Analysis of Designed Experiments
 - Assumptions of the Model: Common Violations
 - Benefits of Data Transformation
 - Box-Cox Method for Selecting the Transformation
 - Analysis of Binary Responses
- Response Surface Designs
 - Choice of Designs for Assessing Response Curvature
 - Box-Behnken & Central Composite Designs
 - Building 2nd-Order Models
 - Contour, Wireframe, and Overlaid Contour Plots
 - Multi-response Optimization
 - Framing the MRO problem, Common MRO Challenges
 - Desirability Functions
 - Use of DOE software for MRO

Day 2

- DOE for "Robust Design"
 - The Robust Design Problem
 - Noise & Control Factors
 - Designs to Address "Robustness"
 - Signal-to-Noise Ratios & Alternative Methods of Analysis
- Final DOE Workshop: Optimizing a Multi-response, Multi-factor Process
 - A team-based competition with limited budget and time



How You Will Benefit

By the end of the course, you will have gained:

- The ability to independently design & analyze a multi-factor experiment;
- Knowledge of experiment designs and analyses for achieving system "robustness:"
- Experience designing and analyzing experiments for optimizing the multiple performance features of a product or process;
- In-class experience applying the course methods to experiments they will design and analyze in order to improve a realistic, multi-variable process;
- Knowledge of how to use the PC-based statistical software systems, JMP 7 or Minitab 15, for the design and analysis of optimization experiments.

Who Should Attend

Engineers, scientists, continuous improvement specialists, quality assurance personnel, or other technical professionals who are responsible for product, process, or test development, improvement, or control activities.

Prerequisites

Course participants should have completed DOE I or the equivalent.

Course Duration

This program will take 16-hours to complete.

Course Materials

Each participant will receive a workbook containing all required course material and a file folder containing electronic copies of the data sets used in the course.

Training Program Fees

ETI Group can present this training program at your facility. Your cost, including all workshop materials and workbooks for up to twelve participants is \$4,500. Please note that this training program and materials can be "tailored" to meet any requirements unique to your company.