



Design of Experiments I, Introduction

Course Overview

Over the last half-century the application of Design of Experiments (DOE) has led to dramatic cost savings, improvements in product and process quality, and faster development of systems of all kinds. As the complexity of today's industrial product and process increases, while project budgets and schedules shrink, the need for DOE implementation by industrial experimenters is as serious as ever. The focus of this 16-hour course is on powerful and practical DOE methods that allow experimenters to successfully investigate the effects of numerous input factors on the multiple output features of the system.

The format includes discussions of actual experiments that have involved the course methods and workshops where participants practice the methods. The use of PC-based statistical software for DOE implementation is demonstrated.

Course Content

Day 1

- Overview of Design of Experiments
 - Twelve Attributes of the Well-Designed Experiment
 - The Powerful Generic Strategy of Experimentation
 - Terms & Definitions, Critical Benefits from Use of DOE
- Six Issues in Planning the Experiment
 - Choice of Responses & Factors
 - Reducing Uncertainty in the Experiment
 - The Sample Size Calculation
- Statistical Comparisons
 - Comparing "signal" to "noise"
 - Decisions about Means, Variances, and Proportions

Day 2

- Designing Multi-variable Experiments
 - The Factorial Design Approach
 - Interactions: Description, Detection, Interpretation
 - Six Steps in the Analysis of Factorial Experiment
- Experiment Designs for Evaluating Numerous Factors
 - Confounding & Design Resolution
 - Applications of Fractional Factorial Designs
 - Strategy of Phased Applications of Designed Experiments
- Control of Extraneous Experiments
 - Randomizing and Blocking the Design
 - Measuring & Isolating the Effects of Extraneous Variables
- Other Practical Experiment Designs: An Overview



How You Will Benefit

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

- A solid grasp of the elements of well-designed experiments;
- An ability to independently design, conduct, and analyze the results from a two-level, multi-factor experiment;
- An awareness of designs for system optimization as well as designs for "robust" product and process development;
- In-class experience applying the course methods to experiments they will design and analyze in order to improve a realistic, multi-variable process;
- Experience using the PC-based statistical software systems, JMP 7 or Minitab 15, for the design and analysis of 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

No pre-requisites are necessary for course participation, although previous exposure to basic statistical methods is helpful.

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.