

Practical Experimentation for Process Improvement (3 days)

Course Overview

DOE is the fundamental statistical technique for establishing cause and effect relationships, which in turn form the foundation for organizational learning. Due to their efficient use of data and deployment in a team environment, learning occurs at an accelerated pace, critical in today's highly competitive markets.

A balanced nine-step framework takes participants from the high-level business issue to be addressed, through the planning, collection, and analysis of the data and to the interpretation of the results. The framework returns to the initial business issue by guiding selection of the best course of action based on parameters set by management, and finally implementing that solution.

This hands on workshop shatters the myth that DOE is too difficult to apply in everyday situations by utilizing unique three-dimensional models to help participants understand the fundamental concepts of experimental design. Several hands-on experiments round out the session, giving participants the opportunity to test their newly acquired skills.

Who is this course for

Anyone needing to improve process performance by identifying the cause and effect relationships that exist between process inputs and outputs will benefit from this course. Scientists, engineers, chemists, technicians, and Lean Six Sigma practitioners in fields such as manufacturing, product and process design, pharmaceuticals, health care, and the service sector will learn techniques that they can put into immediate use after the training.

Course Content

- Types of experimentation
- Why designed experiments are superior
- Minitab and statistics review
- Nine step DOE framework
- Two-level factorial designs - concepts
- Experimental objectives
- Selecting factors, process familiarization
- MSA, replicates versus repeat measures
- Designing the experiment with Minitab
- Hands-on exercise

- Estimating effects, understanding interactions
- Verifying assumptions
- Rectifying assumptions with transformations
- Defining and selecting the best model
- Using the Minitab optimizer function
- Verification runs
- Reducing variation: blocking, replication, randomization
- Split plot designs
- Implementing results
- Checking for more complex responses - centre points
- Hands-on exercise

- Power and replicates
- Fractional factorial designs
- Cleaning up alias issues with Fold-over designs
- Black box process simulation
- Introduction to RSM designs
- Introduction to EVOP
- Introduction to Mixture designs
- Final experiment exercise

Prerequisites

Those planning to attend should have at least a basic understanding of statistical principles (normal distribution, p-values, simple hypothesis testing).

About the Instructor

James A. Alloway, Jr. has been teaching DOE to university students as well as to hundreds of Lean Six Sigma delegates for 21 years. He has made numerous presentations on this topic at local meetings and international conferences for the American Statistical Association, the American Society for Quality, and the Institute of Industrial Engineers. His area of specialization is in developing unique methods to teach the fundamental concepts of DOE to those with little formal training in statistical methods.