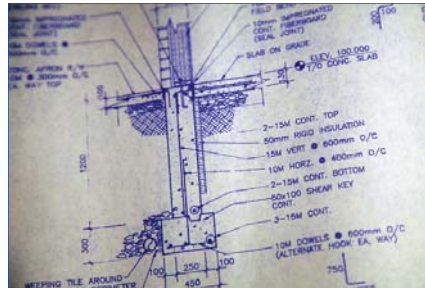


► Design of Experiments

A complex but powerful method to improve product and process design.

Design of Experiments (DOE) is a complex but powerful method of validating product and process designs. So often, organizational experiments are carried out using “best guess” or “one factor at a time” approaches to determine which particular changes or solutions work best. These methods of testing can be time and resource-intensive and may or may not produce the optimal solution in the end.

DOE, on the other hand, guides experimenters through making several simultaneous changes or testing more than one factor at a time. Overall, less time and resources are spent doing fewer experiments, and the result is a better, more reproducible solution.



Course Description

BMGI's Design of Experiments course is for engineers, scientists, researchers and developers who are interested in reducing experiment time and costs, and improving results. The five-day course includes an introduction to statistics before delving into the specifics of conducting a variety of proven experimental designs.

Participants learn about the advantages of fractional and screening designs, in addition to full factorial and Taguchi designs. The last day includes an introduction to more advanced design approaches, including response surface designs and mixture designs.

Along the way, participants discover what type of design works best for the particular outcomes they want to investigate. Case studies, computer and classroom simulation exercises are conducted to reinforce the practical application of DOE methods and analysis. As well, students gain an understanding of how to analyze DOE results using Minitab software (an industry standard).

Course Highlights

Design of Experiments includes many unique highlights, including:

- ❑ Offers a quick and effective way to get up to speed on DOE, without prior or continuing knowledge of Six Sigma.
- ❑ Features extensive practical application, with hands-on exercises and simulations.
- ❑ Designed by the same experienced DOE practitioners who contributed to *The Complete Idiot's Guide to Lean Six Sigma* (AlphaBooks, 2007), and *The Innovator's Toolkit: 50+ Techniques for Predictable and Sustainable Organic Growth* (Wiley, 2008).

“BMGI's training material is comprehensive and, given the complexity of the subject matter, easy to follow.”

— Joe Guthrie
Deployment Leader
Asure

KEY LEARNER OUTCOMES

Participants will learn how to:

- ❑ Enhance product and process development through improved experimentation.
- ❑ Plan, design and conduct more effective experiments with minimal resources and time.
- ❑ Accurately track experiment results during multiple trials.
- ❑ Quickly and easily analyze experiment results using DOE software (Minitab).
- ❑ Reduce development time for new products/processes.
- ❑ Improve process control for higher quality outcomes.

Design of Experiments

Course Specifics

Who Should Attend:

Engineers, researchers and developers, scientists and others who are interested in improving experimental results. Prior Six Sigma training is not required; however, a basic understanding of statistics is required if the four-day course is selected.

Course Length:

Five (5) consecutive days (36 hours of instruction). Or, four (4) days (28 hours of instruction).

Course Requirements:

Laptop computer with Microsoft Excel

CEUs:

BMGI is authorized by IACET to offer 3.6 CEUs for the 5-day program, and 2.8 CEUs for the 4-day option.

Course Agenda

The Design of Experiments course includes the following topics:

▶ Day 1 - Basic Statistics for Engineers (Optional)

- ❑ Data Types, Statistical Measures
- ❑ Introduction to Statistical Software (Minitab)
- ❑ Cause & Effect Diagrams
- ❑ Capability
- ❑ Statistical Process Control
- ❑ Simple Linear Regression & Correlation

▶ Day 2 - Introduction to Design of Experiments

- ❑ On-line vs. Off-line Improvement
- ❑ System/Parameter/Tolerance Design
- ❑ Loss Function Analysis
- ❑ Computer Simulations
- ❑ Design of Experiments Concepts
- ❑ 2k Factorial Designs
- ❑ Randomizing and Blocking Methods
- ❑ Main Effects & Interaction Analysis
- ❑ Multiple Response Optimization

▶ Day 3 - Fractional and Screening Designs

- ❑ 2k Fractional Designs
- ❑ Aliasing and Confounding of Interactions
- ❑ Screening Designs (Plackett - Burman)
- ❑ Classroom Simulations

▶ Day 4 - Full Factorial and Taguchi Designs

- ❑ Multiple Level Designs
- ❑ Interactions, Covariates, Random Factors
- ❑ Transactional DOE's
- ❑ Taguchi Concepts
- ❑ L18 Design

▶ Day 5 - Introduction to Advanced Designs

- ❑ Response Surface Designs
- ❑ Mixture Designs

BMGI holds this class regularly in cities around the world.

Classes can also be scheduled onsite for groups of six or more.

Curriculum is available for licensing.



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