

Course ID

DOE1

Course Duration

1 day

Course Title

Design of Experiments: An Overview

Related Courses

- Industrial Statistics: A Tutorial (INDSTAT, 2 days)
- Design of Experiments: A Comprehensive Course and Workshop (DOE2, 2 -3 days)
- Systems Engineering: An Intermediate Tutorial and Workshop (SYSENG, 2 days)
- Thinking Out of the Box: A Systems Engineering Imperative (OUTOFBOX, 2 days)
- Root Cause Analysis of Systems Failure: A Comprehensive Five Day Workshop (RCFA, 5 days)
- Root Cause Analysis of Systems Failure: A Tutorial (RCFA2D, 2 days)
- Root Cause Analysis of Systems Failure: A Comprehensive Course (RCFA4D, 4days)
- Root Cause Analysis of Component Failure: Understanding Human and Engineering Factors for Improved Product Performance (RCFA-ME, 2-4 days)

Aimed At

This course is aimed at technical personnel involved with developing and optimizing product and process design.

Group Size

5-25

Prerequisites

While there are no formal prerequisites, the course assumes a process, industrial, manufacturing, or engineering background.

Course in a Nutshell

This course brings together important concepts that allow engineering and operations organizations to understand design of experiments approaches, capabilities, and terminology.

We will explain basic statistical concepts and show how they can be used to optimize both the product's design and its manufacturing process. The course covers brainstorming, Ishikawa diagrams, mind-mapping, quality assurance databases, and other approaches for identifying potential key performance parameters, and then structures an organized approach for systematically and quantitatively determining which of these have significant impacts. The course utilizes real-life case studies to help you understand these technologies. At the end of the course, you will have a basic understanding of design of experiments tools, technologies, terminology, and capabilities.

Learn How To

- Work together in an effective team environment to resolve product and process optimization challenges.
- Use the technologies presented in this training to identify key product design and manufacturing process tolerances and control limits.
- Reduce or eliminate areas of specification non-compliance.
- Reduce or eliminate scrap and rework causes.
- Proactively eliminate potential product and process shortfalls before they occur.

**Course
Outline**

- The Nature of the Challenge
 - Product and process design
 - Product and process robustness
 - Identifying potential key performance parameters
 - Deterministic versus probabilistic thinking
- Basic Probability and Statistics Concepts
 - The normal curve: Its history and mathematics
 - Means and standard deviations
 - Using normal curves, means, and standard deviations to predict probabilities of occurrence
 - Confidence levels
 - Sample size considerations
 - Testing for normalcy
 - Exceptions to the normal curve
- Basic Design of Experiments Approaches
 - The z-test
 - The t-test
 - Analysis of variance (ANOVA)
 - Fractional factorial experiments and Taguchi testing
- Applications
 - Test plans
 - Test readiness reviews
 - Using Excel's built in statistical analysis features
 - Case studies
- Course Wrap-up: Recap, Q/A, and evaluations

**How You Will
Learn**

- A highly experienced consulting engineer-instructor will present this course in interactive lecture format.
- Along with the lecture, we use exercises, puzzles, case studies, and interesting group activities to enrich the instruction and drive home the essential points.
- You will receive a Participant Handbook that includes all materials presented in class, which will help you remember and retain what you learned and apply it on your job.
- You will learn key design of experiments concepts from both theoretical and practical perspectives.

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