Design of Experiments for Manufacturing Training Course

Professional Development Training Course Outline

Category	Manufacturing	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Design of Experiments (DOE) for Manufacturing is a powerful, data-driven methodology used to optimize processes, improve product quality, and reduce production costs through structured experimentation. In today's competitive industrial landscape, organizations are increasingly adopting statistical process optimization, Six Sigma methodologies, lean manufacturing integration, and predictive quality engineering to achieve operational excellence. Introduction to Design of Experiments for Manufacturing Training Course equips professionals with practical skills to systematically plan, conduct, analyze, and interpret experiments to identify key process variables and their interactions.

This comprehensive DOE training focuses on real-world manufacturing applications such as process capability improvement, defect reduction, yield enhancement, and robust product design. Participants will learn how to apply factorial designs, response surface methodology, and Taguchi techniques to solve complex engineering problems. By integrating advanced analytics and industrial case studies, the course empowers engineers, quality professionals, and production managers to make data-backed decisions that significantly improve manufacturing performance and customer satisfaction.

Programme Curriculum

Design of Experiments for Manufacturing Training Course

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Course Duration

5 days

Course Objectives

1. Understand fundamentals of Design of Experiments (DOE) in manufacturing systems
2. Apply statistical process optimization techniques for production efficiency
3. Identify critical process parameters using factorial experimental design
4. Improve product quality using Six Sigma DOE methodologies
5. Reduce production variability through process capability analysis
6. Implement Taguchi robust design techniques for quality improvement
7. Analyze interaction effects using ANOVA and regression modeling
8. Optimize manufacturing processes using response surface methodology (RSM)
9. Enhance decision-making through data-driven quality engineering
10. Minimize defects using lean manufacturing experimentation strategies
11. Design efficient experiments for cost reduction in industrial processes
12. Apply DOE tools in real-time production troubleshooting
13. Develop competency in advanced statistical analysis for manufacturing optimization

Target Audience

1. Manufacturing Engineers
2. Quality Assurance and Quality Control Professionals
3. Process Improvement Specialists
4. Production Managers and Supervisors
5. Industrial Engineers
6. Six Sigma Green Belts and Black Belts
7. R&D and Product Development Engineers
8. Operations and Plant Managers

Course Modules

Module 1: Introduction to Design of Experiments (DOE)

- Fundamentals of experimental design
- Importance in manufacturing optimization
- Types of experimental designs
- Role in quality improvement systems
- Case study: reducing machining defects in automotive parts production

Module 2: Statistical Foundations for DOE

- Probability and statistical distributions
- Hypothesis testing basics
- Variance and standard deviation in process control
- Introduction to ANOVA concepts
- Case study: improving yield in electronic assembly line using statistical analysis

Module 3: Full Factorial and Fractional Factorial Designs

- Understanding factorial design structure
- Main effects and interaction effects
- Fractional factorial efficiency techniques
- Screening experiments for critical factors
- Case study: optimizing injection molding parameters for defect reduction

Module 4: Response Surface Methodology (RSM)

- Concept of response optimization
- Central Composite Design (CCD)
- Box-Behnken design applications
- Model fitting and interpretation
- Case study: maximizing tensile strength in metal fabrication process

Module 5: Taguchi Robust Design Techniques

- Orthogonal arrays and signal-to-noise ratio
- Robust parameter design concepts
- Noise factor identification
- Quality loss function
- Case study: reducing vibration in engine component manufacturing

Module 6: ANOVA and Regression Analysis in DOE

- Analysis of variance techniques
- Linear and multiple regression models
- Model validation and diagnostics
- Residual analysis techniques
- Case study: predicting production defects in food packaging industry

Module 7: DOE in Lean Manufacturing and Six Sigma

- Integration of DOE with Lean principles
- DMAIC framework application
- Waste reduction through experimentation
- Process capability improvement
- Case study: cycle time reduction in assembly line production

Module 8: Advanced DOE Applications in Smart Manufacturing

- DOE in Industry 4.0 environments
- AI and machine learning integration
- Real-time process optimization
- Digital twin experimentation models

- Case study: predictive maintenance optimization in CNC machining systems

Training Methodology

This course employs a participatory and hands-on approach to ensure practical learning, including:

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

Ready to enroll or request a customized program? Book online or contact us:

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