Design of Experiments

(16 hours)

Audience and Purpose:
This course is required for all employees who actively work on any aspect of product and process development where the goal is to characterize and optimize product and process performance. This course is required for all Product, Process, QA Engineers and their Managers. Topics include design and analysis of experiments for product and process characterization and optimization.

Course Objectives:
Upon completion of the course the participants will be able to:

- Apply the principles of robust design
- Design experiments appropriate for the information of interest
- Use and apply the structures of orthogonal arrays for industrial problem solving
- Assure the experimental design is efficient
- Use regression techniques in order to analyze the results and make process/product improvements
- Use software to design and analyze experiments

Software: JMP

Prerequisites: ESDA is a requirement

Course Outline:

Section I **Introduction to DOE and Robust Design Principles**
DOE simulation
Eight principles of robust design
Process of experimentation

Section II **Experimental Preparation**
Selecting Factors
Selecting Responses
Selecting Levels
Managing Experimental Error
Sampling Plan
DOE Summary Table

Section III **Full Factorial Designs**

Section IV **Screening Designs**

Section V **Taguchi Designs (optional)**

Section VI **Custom Designs**
D-Optimal, I-Optimal and RSM Designs
Supersaturated Designs
Blocking
Fixed Covariates
Analysis With in Situ Covariates
Augmented Designs

Section VII **Optimization Designs**
CCD and Box Behnken Designs
Path of Steepest Accent

Section VIII **Mixture Designs (optional)**

Section IX **Evolutionary Operations (EVOP) (optional)**