



Robust Optimization and Tolerance Design

(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 establish product and process tolerances. This course is required for all Product/Process Engineers, Scientists and their Managers. Topics include selection and use of transfer functions, statistical methods for distribution analysis, tolerance design and product/process capability assessment.

Course Objectives:

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

- Apply tolerance design to product and process development
- Generate transfer functions from characterization data
- Use transfer functions to set tolerances on the inputs to achieve end-product performance
- Use statistical methods for setting tolerances based on RSS and worst case methodologies
- Use distribution fitting for setting tolerances when no transfer function is available.

Software: JMP, Excel

Prerequisites: ESDA is a requirement

Detailed Course Outline:

- Section I – Distribution and tolerance design foundations
- Section II – Introduction to DOE and robust design
- Section III – Experimental preparation
- Section IV – DOE using custom designs
 - Generating custom designs
 - Evaluating custom designs
 - Analysis of custom designs
 - Strategies to minimize experimental size
 - Adding covariate and uncontrolled factors
 - Special topics for custom designs (optional)
 - Supersaturated designs
 - Split plot designs
 - Blocking designs
 - Setting constraints in the design
 - Saving and storing transfer functions
- Section V – Robust Optimization Methods
- Section VI – Tolerance design and margin analysis