Methodology: Self-pace learning. All learning is presented using animated lessons, quizzes, and hands-on exercises to help you easily learn, apply statistics and how to use Minitab Statistical Software.

Medium: Web-based. Internet connection is required.

Duration: 7 Hours

This learning path emphasizes sound statistical approaches to identify key factors that impact a critical quality measure and optimize a product or process performance. You will explore tools to reduce process variation and expedite research and development projects. Specifically, discover the concepts of randomization, replication, blocking, center points, model building, graphical analysis, and optimization.

Prerequisite: Foundations of Data Analysis

**Course – Analysis of Variance (ANOVA)**

Learning Objectives:

- Detect significant differences in the mean responses from two or more groups.
- Use individual value plots to visualize within- and between-group variation and identify group means.
- Identify groups whose mean responses differ from the mean responses of other groups in the set.
- Detect significant differences in a mean response due to either of two factors or to the interaction between those factors.

Section: Fundamentals of ANOVA

- Basic Concepts
- Graphs and Summary Statistics
- Quiz: Fundamentals of ANOVA

Section: One-Way ANOVA

- Hypothesis Tests
- F-Statistics and P-Values
- Multiple Comparisons
- Assumptions and Residual Plots
- Quiz: One-Way ANOVA
- Minitab Tools: One Way ANOVA
- Exercise: One-Way ANOVA
- Blocking in One-Way ANOVA

Section: Two-Way ANOVA

- Basic Concepts
- Graphs
- Hypothesis Tests
- F-Statistics and P-Values
- Assumptions and Residual Plots
- Quiz: Two-Way ANOVA
- Minitab Tools: Two-Way ANOVA
- Exercise: Two-Way ANOVA

**Course – Design of Experiments**

Learning Objectives:

- Create and analyze factorial designs to find the optimal settings of multiple factors in a process.
- Use blocking to account for unwanted variation in an experiment.
- Use center points to detect curvature in the design space and estimate error without replicating corner points.
- Create and analyze fractional factorial designs to find the optimal settings of multiple factors in a process without running a full design.
- Use Minitab's Response Optimizer to find optimal factor settings.

Section: Factorial Designs

- Primer: T Test for Effects in DOE
- Basic Concepts
- Creating Full Factorial Designs
- Analyzing Full Factorial Designs
- Quiz: Factorial Designs
- Minitab Tools: Create a Full Factorial Design
- Minitab Tools: Analyze a Full Factorial Design
- Exercise: Create a Full Factorial Design
- Exercise: Analyze a Full Factorial Design

Section: Blocking and Incorporating Center Points

- Blocking
- Center Points
- Analyzing Designs with Blocks and Center Points
- Quiz: Blocking and Incorporating Center Points
- Minitab Tools: Create a Factorial Design with Blocks and Center Points
- Minitab Tools: Analyze a Factorial Design with Blocks and Center Points
- Exercise: Create a Factorial Design with Blocks and Center Points

- Exercise: Analyze a Factorial Design with Blocks and Center Points

Section: Fractional Factorial Designs

- Basic Concepts
- Create Fractional Factorial Designs
- Analyze Fractional Factorial Designs
- Quiz: Fractional Factorial Designs
- Minitab Tools: Create a Fractional Factorial Designs
- Minitab Tools: Analyze a Fractional Factorial Design

Section: Response Optimization

- Primer: Response Optimization Using Desirability
- Response Optimization
- Quiz: Response Optimization
- Minitab Tools: Response Optimization
- Exercise: Response Optimization