



Lean Six Sigma Black Belt - EngineRoom

Course Map

Total Estimated Hours: 136.45

SESSION 1: Introduction To Lean Six Sigma

4.65 HOURS

- Introduction
- Higher Standards for Higher Performance
- Input Determines Output
- Lean Six Sigma Defined
- What's In a Name?
- The 5 Lean Principles
- The 8 Forms of Waste
- Success Stories
- The Sigma Level
- The 99.9% Problem
- DNA of a Champion
- Lean Six Sigma Framework
- DMAIC - The Improvement Process
- Lean and DMAIC
- Thought Process Mapping - Toolset
- Organizing for Success
- Working Relationships
- Critical Success Factors
- Introduction to EngineRoom®
- Skill Check

SESSION 2: Define I - Starting A Project and Leading Teams

8.8 HOURS

- Getting Started - Project Initiation
- Balanced Scorecard Toolset
- Project Selection Toolset
- Project Charter Toolset
- Project Planning & Tracking Toolset
- Leadership Thinking
- Robot Leadership
- Fueling The Improvement Engine
- Leadership Characteristics
- Practice, Study and Reflection - Learning by Modeling
- Leading Teams
- Developing an Effective Team
- Improving Team Development
- 4 Conversations Toolset
- Leading Change
- Leading Change - Continued
- Success Factors For Effective Change Management
- Leader Standard Work Toolset
- Stakeholder Analysis - RACI Matrix
- Leadership Reflection
- Exercises and Quiz

SESSION 3: Define II - Voice of the Customer

8.05 HOURS

- Voice of The Customer
- Focus on The Customer
- Understanding Customer Requirements
- Where to Go For Customer Requirements
- Conducting Surveys
- Survey Considerations
- The Degree of Uncertainty in Sampling
- Guideline for Margin of Error
- Affinity Diagram Toolset
- CTQC Tree Diagram Toolset
- Operational Definition Toolset
- Voice Of The Customer As Specifications



- Surveys - Sampling Frame
- Structuring Survey Questions
- QFD Toolset
- Exercises and Quiz

SESSION 4: Define III - Mapping the Process

5.4 HOURS

- Drawing a Process Picture
- Process Thinking
- The Source of Value
- The Source of Value: Gemba
- Process Mapping - Overview
- Process Mapping (SIPOC) Toolset
- Flow Charts
- Value-Added Flow Charts
- Spaghetti Charts
- Takt Time
- Value Stream Mapping Toolset
- Define Tollgate - Progress Review
- Exercises and Quiz

SESSION 5: Measure I - Measurements and Basic Statistics

6 HOURS

- Measurements and Basic Statistics
- Business Problem Solving
- Basic Statistical Terms
- Descriptive and Inferential Statistics
- Measurements
- Discrete vs. Continuous Measurements
- Measurement Subjects
- Graphical Summaries
- Pareto Chart Toolset
- Histogram Toolset
- Understanding Variation
- Measuring Central Tendency
- Quantifying Process Variability
- The Normal Distribution
- Exercises and Quiz

SESSION 6: Measure II - Measurement System Analysis

8.55 HOURS

- Measurement System Analysis - Introduction
- Measurement as a Process
- Cause & Effect Matrix Toolset
- The Analysis of Measurement Systems
- The Requirements of Measurement Systems
- Variable MSA - Gauge R & R
- Attribute Measurement System Analysis
- Calibration of Measurement Systems
- Collecting Data
- Developing a Sampling Plan
- Baseline Performance
- Derivative Performance Metrics - Throughput Yield
- Derivative Performance Metrics - Rolled Throughput Yield
- Calculating the Sigma Level - Toolset
- Exercises and Quiz

SESSION 7: Measure III - Charting Process Behavior

10.5 HOURS

- Introduction - Charting Process Behavior
- Trend Chart (Run Chart) Toolset
- SPC - Introduction and Background
- SPC - Introduction to Control Charts
- SPC - Control Chart Limits
- SPC - More On Control Limits
- Implementing SPC
- Transformation for Control Charts
- Attribute Control Chart Toolset
- X-bar and R Chart Toolset
- SPC Using Stage Variables
- Control Chart Case Study
- Process Capability Toolset
- The Sigma Level Revisited

- SPC Chart Selection
- Rational Subgrouping Toolset
- X and Moving Range Charts - Toolset
- Measure Tollgate - Progress Review
- Exercises and Quiz

SESSION 8: Analyze I - Identifying Potential Root Causes

10.15 HOURS

- ANALYZE I - Introduction
- Finding The Root Cause
- Cause & Effect Diagram Toolset
- Alternative To The Cause & Effect Diagram
- 5-Why, 1-How
- A Combination of 5-Why, Pareto, and Trend Charts
- Box Plots Toolset
- Scatter Plot Toolset
- Correlation and Regression Analysis
- Multiple Regression Toolset
- Binary Logistic Regression Toolset
- Factors In Determining Sample Size
- Estimating Population Mean
- Exercises and Quiz

SESSION 9: Analyze II - Hypothesis Testing

22.4 HOURS

- ANALYZE II - Introduction
- Introduction to Hypothesis Testing
- The Process On Trial
- The Hypothesis - Accept or Reject?
- Types of Error
- Power Analysis
- Power Analysis - Factors
- Hypothesis Testing
- Confidence Intervals
- Treatment Comparisons - Control Charts
- Comparing One Proportion to a Standard
- Comparing Two Proportions Toolset
- Comparing Multiple Proportions - Chi-Square
- Comparing One Mean to a Standard - t-test
- Comparing Two Means - t-test Toolset
- Comparing Multiple Means - ANOVA /F-test Toolset
- Comparing One Variance to a Std. - Chi-Square
- Comparing Two Variances - F-test Toolset
- Parametric vs. Non Parametric Tests
- Non Parametric Toolset
- Hypothesis Testing Learning Lab
- Exercises and Quiz

SESSION 10: Analyze III - Design of Experiments

32.5 HOURS

- Design of Experiments - Introduction
- Design of Experiments - History
- Design of Experiments - Components
- Design of Experiments - Principles
- Design of Experiments - Purpose
- Design of Experiments - Process
- Design of Experiments - Guidelines
- Selecting the Right Design
- Blocking
- Blocking and Tackling
- Faster Deliveries Through Experimentation
- Beyond One-Factor Experiments
- Two Level Full Factorial Toolset
- Two Level Fractional Factorial Toolset
- General Factorial Toolset
- DOE Power and Sample Size
- Designing An Experiment To Save The Kingdom
- Better Pizza Through Design of Experiments
- Designing Experiments to Sell More Coffee
- Additional Subjects
- Analyze Tollgate - Progress Review

SESSION 11: Improve

- Improve
- Design for Lean Six Sigma (DFSS)
- Benchmarking
- Brainstorming
- Narrowing Down The List of Ideas
- FMEA Toolset
- Error-proofing
- Prioritizing and Selecting a Solution
- The A3 One-Page Report
- Continuous Flow Toolset
- Quick Changeover Toolset
- Cellular Processing Toolset

SESSION 12: Control

- Control
- Control Charts Revisited
- The Process Control Plan
- More On FMEA
- Visual Management
- 5-S Approach
- CHECK Process
- Total Productive Maintenance
- TPM Objectives & Benefits
- TPM Metrics

- Design of Experiments Exercises and Quiz

12.75 HOURS

- Leveling Production (Heijunka)
- The Theory of Constraints (TOC) Toolset
- Pull System Overview
- Pull Scheduling
- Core Process Pull Toolset
- Replenishment Pull Overview
- Kaizen Toolset
- Corrective Action Matrix
- Piloting a Solution
- System Dynamics Toolset
- Improve Tollgate - Progress Review
- Exercises and Quiz

6.7 HOURS

- TPM Core Elements
- TPM Maintenance Activities
- Best Practices and Lessons Learned
- Standardized Work - Documenting Process Changes
- Ending the Project
- Control Tollgate - Progress Review
- Exercises and Quiz
- Course Completion
- The Lean Six Sigma Journey