

Beyond Z's Lean Six Sigma Curriculum for Green Belts

1.0 Introduction & Define

- 1.1 The Basics of Six Sigma
 - 1.1.1 Meanings of Six Sigma
 - 1.1.2 General History of Six Sigma & Continuous Improvement
 - 1.1.3 Deliverables of a Lean Six Sigma Project
 - 1.1.4 The Problem Solving Strategy $Y = f(x)$
 - 1.1.5 Voice of the Customer, Business and Employee
 - 1.1.6 Six Sigma Roles & Responsibilities
- 1.2 The Fundamentals of Six Sigma
 - 1.2.1 Defining a Process
 - 1.2.2 Critical to Quality Characteristics (CTQ's)
 - 1.2.3 Cost of Poor Quality (COPQ)
- 1.3 Selecting Lean Six Sigma Projects
 - 1.3.1 Building a Business Case & Project Charter
 - 1.3.2 Developing Project Metrics
 - 1.3.3 Financial Evaluation & Benefits Capture
- 1.4 The Lean Enterprise
 - 1.4.1 Understanding Lean
 - 1.4.2 The History of Lean
 - 1.4.3 Lean & Six Sigma
 - 1.4.4 The Eight Elements of Waste

2.0 Measure

- 2.1 Process Definition
 - 2.1.1 Cause & Effect Matrix
 - 2.1.2 Process Mapping, SIPOC, Value Stream Map
 - 2.1.3 Failure Modes & Effects Analysis (FMEA)
- 2.2 Six Sigma Statistics
 - 2.2.1 Basic Statistics
 - 2.2.2 Descriptive Statistics
 - 2.2.3 Normal Distributions & Normality
 - 2.2.4 Quality Tools- Graphical Analysis
Histogram, Box Plot, Run Chart, Pareto Chart, Scatter Plot
- 2.3 Measurement System Analysis
 - 2.3.1 Precision & Accuracy
 - 2.3.2 Bias, Linearity & Stability
 - 2.3.3 Gage Repeatability & Reproducibility
 - 2.3.4 Variable & Attribute MSA

- 2.4 Process Capability
 - 2.4.1 Capability Analysis
 - 2.4.2 Concept of Stability
 - 2.4.3 Attribute & Discrete Capability
Including DPU, DPMO, FTY, RTY
 - 2.4.4 Monitoring Techniques
- 2.5 Sampling
 - 2.5.1 Understanding the need for Sampling
 - 2.5.2 Types of Sampling

3.0 Analyze

- 3.1 Patterns of Variation
 - 3.1.1 Multi-Vari Analysis
 - 3.1.2 Classes of Distributions
- 3.2 Inferential Statistics
 - 3.2.1 Understanding Inference
 - 3.2.2 Central Limit Theorem
- 3.3 Hypothesis Testing
 - 3.3.1 General Concepts & Goals of Hypothesis Testing
 - 3.3.2 Significance; Practical vs. Statistical
 - 3.3.3 Risk; Alpha & Beta
 - 3.3.4 Types of Hypothesis Test
- 3.4 Hypothesis Testing with Normal Data
 - 3.4.1 1 & 2 sample t-tests
 - 3.4.2 1 sample variance
 - 3.4.3 One Way ANOVA : Including Tests of Equal Variance, Normality Testing and Sample Size Calculation. Performing tests and interpreting results.
- 3.5 Hypothesis Testing with Non-Normal Data
 - 3.5.1 Mann-Whitney
 - 3.5.2 Kruskal-Wallis
 - 3.5.3 Mood's Median
 - 3.5.4 Sample Sign
 - 3.5.5 One and Two Sample Proportion
 - 3.5.6 Chi-Squared (Contingency Tables)
. Including Tests of Equal Variance, Normality Testing and Sample Size calculation, performing tests and interpreting results.

- 3.6 Regression
 - 3.6.1 Simple Linear Regression
 - 3.6.2 Correlation
 - 3.6.3 Regression Equations
 - 3.6.4 Multiple Regression

- 3.7 Lean Concepts
 - 3.7.1 Process Flow and Operations
 - 3.7.2 Push vs Pull
 - 3.7.3 FIFO
 - 3.7.4. Standard Work
 - 3.7.5 Takt Time

4.0 Improve

- 4.1 5S - Sort, Set in order, Shine, Standardize, Sustain
- 4.2 Lean Tools & Techniques
 - 4.2.1 Cellular Manufacturing
 - 4.2.2 Heijunka
 - 4.2.3 Kanban
 - 4.2.4 Quick Change Over
 - 4.2.5 Jidoka
 - 4.2.6 Kaizen Event
 - 4.2.7 Poka-Yoke (Mistake Proofing)
 - 4.2.8 Total Productive Maintenance
- 4.3 Pugh Matrix
- 4.4 Ideation
- 4.5 Pilot Study

5.0 Control

- 5.1 Lean Controls
 - 5.1.1 Control Methods for 5S
 - 5.1.2 Kanban
 - 5.1.3 Poka-Yoke (Mistake Proofing)

5.2 Statistical Process Control (SPC)

- 5.2.1 Data Collection for SPC
- 5.2.2 I-MR Chart
- 5.2.3 Xbar-R Chart
- 5.2.4 U Chart
- 5.2.5 P Chart
- 5.2.6 NP Chart
- 5.2.7 Xbar-S Chart
- 5.2.8 Control Chart Anatomy

5.3 Six Sigma Control Plans

- 5.3.1 Cost Benefit Analysis
- 5.3.2 Elements of the Control Plan
- 5.3.3 Elements of the Response Plan

6. Team Development & Presentation

- 6.1 Team Management
- 6.2 Effective Team Meetings
- 6.3 Team Roles
- 6.4 Making Presentations

7. Introduction to Minitab / Sigma XL