

Lean Six Sigma Black Belt Onsite & Virtual Workshop - 10 days

Define Phase	Summary List of Green Belt Knowledge - prerequisite
	1.0 Define Phase
	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
	1.2.2 Critical to Quality Characteristics (CTQ's)
	1.2.3 Cost of Poor Quality (COPQ)
	1.2.4 Pareto Analysis (80:20 rule)
	1.2.5 Basic Six Sigma Metrics
	a. including DPU, DPMO, FTY, RTY Cycle Time
	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
Measure Phase	2.0 Measure Phase
	2.1 Process Definition
	2.1.1 Cause & Effect / Fishbone Diagrams
	2.1.2 Process Mapping, SIPOC, Value Stream Map
	2.1.3 X-Y Diagram
	2.1.4 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 Graphical Analysis
	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
2.4.4 Monitoring Techniques	

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Analyze Phase	3.0 Analyze Phase
	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 Sampling Techniques & Uses
	3.2.3 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
	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 Friedman
	3.5.5 1 Sample Sign
	3.5.6 1 Sample Wilcoxon
3.5.7 One and Two Sample Proportion	
3.5.8 Chi-Squared (Contingency Tables)	

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Improve Phase	4.0 Improve Phase
	4.1 Simple Linear Regression
	4.1.1 Correlation
	4.1.2 Regression Equations
	4.1.3 Residuals Analysis
	4.2 Multiple Regression Analysis
	4.2.1 Non- Linear Regression
	4.2.2 Multiple Linear Regression
	4.2.3 Confidence & Prediction Intervals
	4.2.4 Residuals Analysis
	4.2.5 Data Transformation, Box Cox
	4.2.3 Confidence & Prediction Intervals
	4.2.4 Residuals Analysis
	4.2.5 Data Transformation, Box Cox
	4.3 Designed Experiments
	4.3.1 Experiment Objectives
	4.3.2 Experimental Methods
	4.3.3 Experiment Design Considerations
	4.4 Full Factorial Experiments
	4.4.1 2k Full Factorial Designs
	4.4.2 Linear & Quadratic Mathematical Models
	4.4.3 Balanced & Orthogonal Designs
	4.4.4 Fit, Diagnose Model and Center Points
	4.5 Fractional Factorial Experiments
	4.5.1 Designs
	4.5.2 Confounding Effects
	4.5.3 Experimental Resolution

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Control Phase	5.0 Control Plan
	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 CuSum Chart
	5.2.9 EWMA Chart
	5.2.10 Control Chart Anatomy
	5.2.11 Control Methods
	5.2.12 Subgroups, Impact of Variation, Frequency of Sampling
	5.2.13 Center Line & Control Limit Calculations
	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	
Certification Exam Requirements	Caldwell & Associate Certification Exam included with the course. LSSBB project must be approved.
	You must have a lean six sigma black belt project and pass the exam by 70% or higher for certification.
	Lean Six Sigma Master Black Belt Project consulting consultation to completion of the project.