

Lean Six Sigma Black Belt (LSSBB) Course Content

Session 00 - Course Introduction

Session 01 - Define Phase

Lesson 01 - The Basics of Six Sigma

- Introduction to define phase
- Learning objectives
- Six Sigma
- Lean
- Sigma shift
- Yield
- Continuous Improvement Process Evolution
- Six Sigma Deliverables
- Problem Solving Strategy
- VOC Campaign
- VOC Tools
- KANO Analysis
- Six Sigma Roles and Responsibilities
- Project Champion and Master Black Belt
- Black Belt and Yellow Belt
- Drivers of Six Sigma

Lesson 02 - The Fundamentals of Six Sigma

- Process
- Project charter
- Critical to quality
- Cost of poor quality
- Calculating CoPQ
- Pareto Analysis
- Basic six sigma metrics

Lesson 03 - Selecting Lean Six Sigma Projects

- Selecting Lean Six Sigma Projects
- Project Selection Roadmap
- Project Charter Elements
- Project Charter Business Case
- Project Charter Problem Statement
- Project Charter Goal Statement
- Project Charter Scope
- Project Charter Key Milestones
- Project Charter Team Selection
- Tuckman's Stages of Team Formation
- The RACI Matrix
- Expected Financial Benefits
- Developing Project Metrics
- Key performance indicators
- Financial Evaluation and Benefits Capture
- Net present value

Lesson 04 - The Lean Enterprise

- Selecting lean six sigma projects
- Principles of Lean
- Lean Methodology
- Lean and Six Sigma
- 3M's of Lean
- Categories of Waste: TIMWOOD
- Category of Waste: DOWNTIME
- 5S
- Steps in 5S

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Session 02 - Measure Phase

Lesson 01 - Process Definition

- Introduction to measure phase
- Learning Objectives
- Tools to Define a Process
- Cause and Effect Diagram
- Drawing a Fishbone diagram
- Root Cause
- Process Mapping
- Creating a Process Map
- Process Mapping Levels
- Four Types of Process Maps
- SIPOC Process Map
- Value Stream Maps
- Value Stream Maps: Key Metrics
- X-Y Diagram or Scatter Plots
- Failure Mode and Effects Analysis (FMEA)
- FMEA Process
- FMEA Template
- Severity, Occurrence, and Detection Table
- Risk Priority Number (RPN)

Lesson 02 - Six Sigma Statistics

- Data
- Measuring data
- Basic Statistics
- Measures of Central Tendency
- Measures of Dispersion
- Data Collection Plan
- Data Collection Methodology
- Develop a Measurement Plan
- Collect Data
- Sampling
- Sampling methods
- Graphical Analysis
- Graphical Analysis Tool
- Introduction to Minitab
- Demo: Box Plot One Variable
- Demo: Box Plot with Three Variables
- Demo: Time series plot
- Normal Distribution
- Standard Normal Distribution
- Demo: Normality

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Lesson 03 - Measurement System Analysis

- Introduction
- Measurement System Analysis: Overview
- Good and Poor Measurement System Analysis
- Measurement Error: Categories
- MSA: Sources of Variation
- Repeatability
- Reproducibility
- Accuracy and Precision
- Bias
- Stability
- Linearity
- MSA: Types
- Gage R&R Guidance in MINITAB
- Gage R&R Ground Rules
- Demo: Gage R_R Continuous Data
- Attribute Gage Study
- Demo: Gage R_R Attribute Data

Lesson 04- Process Capability

- Introduction
- Process Capability
- RUMBA Analysis
- Process Capabilities
- Data Types
- Baseline Performance
- Components of Variation
- Process Stability
- Process Capability: Indices
- Demo: Capability Analysis Continuous Data
- Process Capability Indices: Example
- Demo: Capability Analysis Continuous Data Sigma Level
- Z Score
- Process Baseline
- Defects Per Unit
- Defects Per Million Opportunities
- Attribute Data: Example
- Short-term and long-term Process Capability

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Session 03 - Analyze Phase

Lesson 01 - Classes of Distribution

- Introduction to Analyze phase
- Learning Objectives
- Frequency Distribution
- Demo: Frequency Distribution
- Probability Distribution
- Types of Probability Distribution
- Types of Discrete Probability Distribution
- Types of Continuous Probability Distribution

Lesson 02 - Inferential Statistics

- Introduction
- Inferential Statistics
- Branches of Inferential Statistics
- Central Limit Theorem

Lesson 03 - Hypothesis Testing

- Introduction
- Basics of Hypothesis Testing
- Confidence Interval
- Significant difference
- Detecting Significance
- Statistical Hypothesis Test
- Hypothesis Testing: Risks
- Beta Risk
- Power of a Hypothesis Test
- Sample Size
- Hypothesis Testing Roadmap

Lesson 04 - Hypothesis Testing with Normal Data

- Introduction
- Normal Data
- One Sample t-test
- One Sample t-test Sample Size
- Demo: 1 sample t test

- Two-Sample t-test
- Two-Sample t-test Example
- Demo: 2 sample t test
- Demo: Bartlett's Test
- Paired t-test
- Demo: Paired test
- ANOVA
- Demo: Anova
- Residual Plot

Lesson 05 - Hypothesis Testing with Non-Normal Data

- Introduction
- Non-Parametric Tests
- Mann-Whitney Tests
- Demo: Mann Whitney Test
- Kruskal-Wallis Test
- Demo: Kruskal Wallis Test
- Mood's Median Test
- Demo: Mood's Median Test
- Friedman Test
- Demo: Friedman Test
- 1 Sample Sign Test
- Demo: 1_Sample_Sign_Test
- 1 Sample Wilcoxon Test
- Demo: 1 Sample Wilcoxon Test
- One-Sample Proportion Test
- Demo: One-Sample Proportion Test
- Two-Sample Proportion Test
- Demo: Two-Sample Proportion Test
- Chi-Square Tests
- Demo: Chi-Square Test of Independence
- Chi-Square Goodness-of-Fit Test
- Demo: Chi-Square Goodness-of-Fit Test
- Chi-Square Cross Tabulation
- Demo: Chi-Square Cross Tabulation
- Demo: Levene F-Test

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Session 04: Improve Phase

Lesson 01 - Simple Linear Regression

- Introduction to improve phase
- Learning objectives
- Correlation
- Demo: correlation
- Demo: Scatter plot
- Correlation and Causation
- Predictor measures and Results
- Correlation Coefficients
- Regression Analysis
- Demo: Regression
- Residual Analysis

Lesson 02 - Multiple Regression Analysis

- Introduction
- Multi-Vari Analysis
- Demo: Multi-Vari Analysis
- Non Linear Regression
- Multiple Linear Regression
- Demo: Multiple Linear Regression
- Variance Inflation Factor (VIF)
- Variance Inflation Factor (VIF): Example
- Confidence Interval in Multiple Linear Regression
- Box Cox Transformation
- Demo: Box-Cox Transformation

Lesson 03 - Designed Experiments

- Introduction
- Designed Experiments
- Phases of DOE Process
- Optimization and confirmation
- Types of DOE Strategies
- Full Factorial and Fractional Factorial Approaches
- Experimental Design: Considerations

Lesson 04 - Factorial Experiments

- Introduction
- Factorial Designs
- Full Factorial Experiments
- Demo: Full Factorial Experiments
- Quadratic Models
- Types of Response Surface Designs
- Balanced and Orthogonal Design
- Center Points
- Fractional Factorial Experiment
- Confounding

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Session 05 - Control Phase

Lesson 01 - Lean Controls

- Introduction to Control Phase
- Learning Objectives
- Control Methods of 5S
- Sort
- Set in order
- Shine standardize and sustain
- Kanban
- Kanban Principles
- Steps to Implement Kanban
- Poka Yoke or Mistake Proofing
- Mistake Proofing Examples

Lesson 02 - Statistical Process Control (SPC)

- Introduction
- Statistical Process Control: Purpose
- Control Charts
- Control Charts: Objectives
- Control Charts: Uses
- Control Charts: Types
- Control Charts: Steps
- Subgroup
- Consideration for Rational Subgrouping
- Charts for Attribute Data
- Tests for Special Causes

- Demo: I MR chart
- Demo: X Bar R chart
- Demo: X Bar s chart
- Demo: P charts
- Demo: NP carts
- Demo: U Charts
- Demo: C charts
- Demo: Cusum chart
- Demo: EWMA chart

Lesson 03 - Six Sigma Control Plans

- Introduction
- Project Cost Benefit Analysis
- Return on Investment (ROI)
- Cost Benefit Analysis
- Cost Benefit Analysis: Steps
- NPV and IRR
- Selecting the Right Solutions: Guidelines
- Implementation of Proposed Solutions: Roadmap
- Control Plan
- Elements of a Control Plan
- Control Plan: Training
- Response Plan
- Project Closure

Course Projects

- V-tech Hydraulic Solutions
- Elite Elegance

For more information, please contact us at info@pmintegrated.com