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# Certified Six Sigma Black Belt

## Introduction:

Six Sigma is a quality improvement methodology structured to reduce product or service failure rates to a negligible level. Six Sigma companies typically spend less than five percent of their revenues addressing and repairing quality problems.

To achieve these levels, the Six Sigma process encompasses all aspects of a business; including management, service delivery, and design, production and customer satisfaction. As a philosophy, Six Sigma drives business culture and requires a nearly flawless execution of key processes, making Six Sigma a high standard for companies and individuals to achieve. By reducing process variation, Six Sigma frees an organization to focus on improving process capability. As sigma levels increase, the cost of poor quality decreases and profitability increases. This is why Six Sigma is highly associated with the delivery of consistent, world-class quality.

Black Belts are at the core of every Six Sigma implementation. Motorola used the term "Black Belt" to describe "an individual who has developed a synergistic proficiency between his or her technical discipline and the Six Sigma strategies, tactics, and tools. These individuals will continually work towards institutionalizing the effective use of these tools throughout the corporation, its clients, and its suppliers."

This course is complying with the requirements of the International Association for Six-Sigma Certification.

## Course Duration

10 days

## Tools Used

Excel 2013 and Minitab 16

## Book Reference

Introduction to Materials Management - 6th edition - 2008 - J. R. Tony Arnold, Stephen N. Chapman and Lloyd M. Clive - Prentice Hall

How to Implement Lean Manufacturing - 2010 - Lonnie Wilson - McGraw-Hill

Implementing Six Sigma - 2nd Edition - 2003 - Forrest W. Breyfogle Iii - John Wiley & Sons

Learning To See - Version 1.2 - 1999 - Mike Rother And John Shook - Lean Enterprise Institute

Six Sigma Quality Improvement with Minitab - 2nd edition - 2011 - G. Robin Henderson - John Wiley & Sons

## Course Objectives:

**By the end of this course delegates will be able to:**

- Application of Six Sigma; Six Sigma tool kit to deploy
- Value-stream process mapping; tracking process defects
- DPU, DPMO and Sigma level exercise
- Statistical process control, principles and applications
- Variable control charts, attribute control charts
- Discipline problem solving
- Identifying and verifying root cause
- Permanent corrective action (PCA); preventing recurrence
- DMAIC Methodology -Define, measure, analyze, improve, control DMAIC checklists

- Failure mode and effects analysis

### **Benefits of Attendees:**

- Supply base and material management
- Information and technology sharing
- Benchmarking
- Balance scorecard
- Traditional management vs. Six sigma management
- Six sigma benefits to an organization
- More on DMAIC Methodology

### **Course Outline:**

1. Why Six Sigma?
2. Definition of Six Sigma
3. Comparisons between typical TQM and Six Sigma Programs
4. Origins and Success Stories
5. How to Deploy Six Sigma
  - Organizational Metrics and Dashboards
  - Data-driven Decision Making
  - Description of the Roles and Responsibilities
  - Leadership Responsibilities

### **DEFINE: Project Definition**

- Tasks
- B. Work Breakdown Structure

- C. Pareto Diagrams
- Matrix Diagrams
- Project Charters

#### **DEFINE: Change Management Teams**

- Problems with Change
  - Achieving Buy-in
  - Team Formation, Rules, and Responsibilities
1. Stages of Team Development
  2. Overcoming Problems
- Consensus Building
1. Affinity Diagram \_
  2. Prioritization Matrix

#### **MEASURE: Tools and Objectives**

- Measure Stage Objectives
- Flowcharts
- SIPOC
- Rolled Throughput Yield
- Process Mapping
- Process C&E
- Minitab Review
- Descriptive Statistics review

#### **MEASURE: Establishing Process Baseline**

- Interpretation
  - Benefits of Control Charts
  - Requirements vs. Control
  - Control Chart Interpretation
1. X-Bar Charts and Individuals Charts

#### **MEASURE: Process Capability**

1. Histograms
2. Probability Plots
3. Capability and Performance Indices
4. Relative to Process Control
5. Interpretation

#### **ANALYZE: Introduction to Linear Regression Analysis**

- Scatter Diagrams
- Linear Model
- Interpreting the ANOVA Table
- Overview of Multiple Regression Tools
- Testing Variances
- Testing Means
- General Linear Model
- Main effects and Interactions
- Non-Linear Regression
- Confidence Intervals
- Non-Normal Distribution Analysis
- Non-Parametric tests

#### **ANALYZE: Lean Thinking**

- Definition of Waste
- Analyzing Process for NVA
- Lead Time and Velocity
- Methods to Increase Velocity
- Standardization
- Optimization
- 5S
- VSM
- Lean Controls

1. Kanban
2. Poka-Yoke

### **IMPROVE: Tools and Objectives**

- Improve Stage Objectives
- Tools to Prioritize Improvement Opportunities
- Tools to Define and Mitigate Failure Modes
- FMEA
- Introduction to DOE
- Full Factorial Experiments
- Full Factorial Simulations
- 2K Factorials
- DOE Sample Size Selection
- Fractional Factorials
- Statapult Exercise

### **CONTROL: Tools and Objectives**

- Control Stage Objectives
- Training
- Measuring Improvement
- EVOP / Plex
- Response Surface Designs
- Control Charts review
- Shewhart tests for stability
- Lean & Six Sigma Synergy
- Process Control Plans
- Project Planning & Deliverables