

## Six Sigma Black Belt Certification

- 10-day classroom course (max 7 people)
- 1 year to complete 2 projects
- Monthly mentoring sessions during the projects
- Final sign off meeting
- Certification
- Minimum saving of £100,000 per delegate per project (£200,000 in total)



## Objectives

By the end of this course, participants will be able to:

- Apply the black belt six sigma tools and methodologies to projects
- Administer every stage of a project to black belt requirements
- Demonstrate an in-depth knowledge of applying the black belt six sigma DMAIC
- Build process models to make improvements
- Implement defined solutions
- Apply operational change management techniques within their defined scope or domain.
- Lead large scale black belt improvement projects
- Lead and improve team
- Mentor yellow and green belts
- Identify areas within their business where six sigma black belt projects can be applied.
- Run projects within their company to save in excess of £100,000 per project

## Content

A sample of what is covered includes:

### Define Phase

- The Basics of Six Sigma
  - Meanings of Six Sigma
  - General History of Six Sigma & Continuous Improvement
  - Deliverables of a Lean Six Sigma Project
  - The Problem-Solving Strategy  $Y = f(x)$
  - Voice of the Customer, Business and Employee
  - Six Sigma Roles & Responsibilities
- The Fundamentals of Six Sigma
  - Defining a Process
  - Serious Quality Characteristics (CTQ's)
  - Poor Quality Cost
  - The Pareto Analysis (80:20 rule)
  - Six Sigma - Measurement Standards
- Selecting Lean Six Sigma Projects
  - Building a Business Case & Project Charter
  - Developing Project Metrics
  - Financial Evaluation & Benefits Capture

- Understanding The Lean Enterprise
  - Lean - An Understanding and its History
  - The Combination of Lean & Six Sigma
  - The Seven Waste Elements
  - 5S
  - Straigten, Shine, Standardise, Self-Discipline, Sort

#### Measure Phase

- Process Definition
  - Cause & Effect / Fishbone Diagrams
  - Process Mapping, SIPOC, Value Stream Map
  - X-Y Diagram
  - Failure Modes & Effects Analysis (FMEA)
- Six Sigma Statistics
  - Basic Statistics
  - Descriptive Statistics
  - Normal Distributions & Normality
  - Graphical Analysis
- Measurement System Analysis
  - Precision & Accuracy
  - Bias, Linearity & Stability
  - Gage Repeatability & Reproducibility
  - Variable & Attribute MSA
- Process Capability
  - Capability Analysis
  - Concept of Stability
  - Attribute & Discrete Capability
  - Monitoring Techniques

#### Analyze Phase

- Patterns of Variation
  - Multi-Vari Analysis
  - Classes of Distributions
- Inferential Statistics
  - Understanding Inference
  - Sampling Techniques & Uses
  - Central Limit Theorem
- Hypothesis Testing
  - General Concepts & Goals of Hypothesis Testing
  - Significance; Practical vs. Statistical
  - Risk; Alpha & Beta
  - Types of Hypothesis Test
- Hypothesis Testing with Normal Data
  - 1 & 2 sample t-tests
  - 1 sample variance
  - One Way ANOVA
- Hypothesis Testing with Non-Normal Data
  - Mann-Whitney
  - Kruskal-Wallis
  - Mood's Median
  - Friedman
  - 1 Sample Sign
  - 1 Sample Wilcoxon
  - One and Two Sample Proportion
  - Chi-Squared (Contingency Tables)

#### Improve Phase

- Simple Linear Regression
  - Correlation
  - Regression Equations
  - Residuals Analysis
- Multiple Regression Analysis
  - Non- Linear Regression
  - Multiple Linear Regression
  - Confidence & Prediction Intervals
  - Residuals Analysis
  - Data Transformation, Box-Cox
- Designed Experiments
  - Experiment Objectives
  - Experimental Methods
  - Experiment Design Considerations
- Full Factorial Experiments
  - 2k Full Factorial Designs
  - Linear & Quadratic Mathematical Models
  - Balanced & Orthogonal Designs
  - Fit, Diagnose Model and Center Points
- Fractional Factorial Experiments
  - Designs
  - Confounding Effects
  - Experimental Resolution

#### **Control Phase**

- Lean Controls
  - Control Methods for 5S
  - Kanban
  - Poka-Yoke (Mistake Proofing)
- Statistical Process Control (SPC)
  - Data Collection for SPC
  - I-MR Chart
  - Xbar-R Chart
  - U Chart
  - P Chart
  - NP Chart
  - Xbar-S Chart
  - CumSum Chart
  - EWMA Chart
  - Control Methods
  - Control Chart Anatomy
  - Subgroups, Impact of Variation, Frequency of Sampling
  - Center Line & Control Limit Calculations
- Six Sigma Control Plans
  - Cost Benefit Analysis
  - Elements of the Control Plan
  - Elements of the Response Plan

To take the black belt training you must be a green belt.

At the end of Lean & Six Sigma Black Belt training you will have a far greater knowledge of how the 2 methodologies can improve & enhance the business.

The training will involve 10 days of classroom theory inclusive of practical experiments.

This is then followed by 2 on the job projects, which involves using all the tools correctly and making a cost saving or increase in productivity that would enhance the company profit by a minimum of £100,000 each project. Alternatively, you can complete one project to the value of £100,000 within 6 months and prove a history of 3 years in a role of quality management and should have worked in process improvement projects.

During the project stage the trainer will meet with each delegate once per month. During these sessions they will check they are on track with their project (in terms of using the right tools, passing each stage and making savings), ideally this is a face to face session. We can mix some remote sessions with face to face sessions if need be.

At the end of the project(s) they need to meet again to validate that they have used the correct “tools”, made the right savings and be certified as Six Sigma Black Belts.

