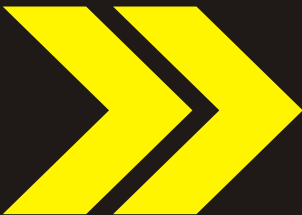




Six Sigma
Black Belt Program



CERTIFIED SIX SIGMA BLACK BELT

Black Belts are perceived to be future leaders in the organization. A leader who has traveled the path of a "Change Agent" and has gained mastery over methodologies of achieving breakthrough improvements focused on business and its customers. Such prospective leaders are identified and subjected to an intensive SIX SIGMA BLACK BELT TRAINING & CERTIFICATION.

Who Should attend?

Middle & Senior Management representatives e.g. Sr. Managers Asst. Managers, Sr. Executives, Team Leaders, Project Leaders/ Project Managers etc., with at least 15 years of Education & 4 years of work Experience.

Duration

The program is spread across 16 full day sessions. Each session is accomplished with an objective to link concepts covered to participant's own work area and the project/s they are working on.

Examination & Certification Criteria

Examination Duration: 4 hrs

Total Questions: 150

QP Pattern: Objective type, Multiple choice & Open book examination.

Certification Criteria: Participant should have successfully cleared the final certification exam and should have completed at least one improvement project with significant impact on business results.

Benefits

The benefit of this program can be perceived in two broad ways, Firstly, the participant will witness significant transformation in his/her own ways of managing day to day work, on completion of this program participants will gain:

- Systematic approach to problem solving.
- Ability to identify & Lead improvement initiatives focused on voice of Business & its Customers.
- Data based approach for decision making.
- Expertise to drive organizational change process.
- Ability to Teach, Train and Transfer the methodologies of achieving continuous improvements.

Secondly, such trained & Certified professionals become an asset to the organization who have the capability to lead the organization towards achieving superior performance levels. On the virtue of this ability, they add value and are valued.

Syllabus, described for this program is covered at following levels of understanding ,

Memorize: Remember terms, definitions, facts, ideas, patterns etc.

Comprehension: Comprehend descriptions, reports, tables, diagrams etc.

Practice: When to use which tools, ideas, methods, formulae, principles, constituents etc.

Analyze: Decipher the information and draw relationships between its constituents, Identify factors influencing constituents etc.

Appraise: Evaluate ideas and conclude about the values or the proposed solutions or ideas.

Construct: Combine all parts to reveal a pattern or a structure to draw a conclusion.

I. SIX SIGMA & LEAN - OVERVIEW & PHILOSOPHY (20 QUESTIONS)

Deploying continuous improvement programs in an organization

Continuous Improvement:

Origin of continuous improvement and its impact on other improvement models.(Memorize)

Value of Six sigma, its Philosophy, History, and Goals. (Comprehension)

Value of Lean, its Philosophy, History and Goals. (Comprehension)

Relationship between Lean and Six Sigma. (Comprehension)

Relationship between various business process

(Design, Production, Purchasing, Accounting, Sales etc.) and the impact these relationships can have on business systems. (Comprehension)

How Six Sigma and Lean tools are applied to processes

in all types of enterprises: Manufacturing, Service Transactional Product and Process design, Innovation etc. (Comprehension)

Top Management:

Responsibilities of executive leaders and how they affect deployment of Six Sigma in terms of providing resources, managing change, communicating ideas, etc. (Comprehension)

Impact on the organization's culture and inherent

structure can have on the success of Six Sigma, and how deployment failure can result from the lack of resources, management support etc., Identify and apply various techniques to overcome these barriers. (Practice)

Techniques for facilitating and managing organizational change. (Practice)

How projects and Kaizen events are selected, when to use

Six Sigma instead of other problem-solving approaches and the importance of aligning their objectives with organizational goals. (Practice)

Roles and responsibilities of Six Sigma participants:

MBB, BB, GB, YB, Champions, Process owners and Project sponsors. (Comprehension)

Process Management & Measures:

Impact of Six Sigma Projects on Customers, Suppliers and Stakeholders.

(Comprehension)

Identify CTQ's (Critical to Quality) parameters within a project.(Practice)

Various types of Benchmarking including best practices.(Practice)

Understand various business performance measures including Balance Scorecard, key performance indicators (KPIs), financial impact of customer loyalty, etc.(Comprehension)

Understand and use Financial measures, including revenue growth market share, margin, COPQ, NPV, ROI, Cost-benefit Analysis for a project.

(Practice)

Organizing & Managing continuous improvement teams

Team Dynamics

Understand & Explain various types of Teams (e.g., Formal, Informal, virtual, Cross functional, self-directed, etc.) And determine what team model will work best for a given situation. Identify constraining factors including geography, technology, schedules, etc. (Practice)

Understand & Explain various team roles and responsibilities.

(Comprehension)

Understand & Explain factors influencing team selection , including expertise, availability etc. (Practice)

Identify and describe the elements of launching a team, including having management support, establishing clear goals, ground rules etc. (Practice)

Team Development & Motivation

Techniques of Team motivation to ensure their support, establishing clear goals, ground rules and timeliness etc. (Practice)

Stages of Team Development (Forming, Storming, Norming, Performing & Adjourning). (Practice)

Team Facilitation

Identification and use of appropriate communication methods to report progress, conduct milestones reviews etc. (Practice)

Identification of various techniques to overcome team dynamic challenges like overbearing/dominant or reluctant team members etc.

(Appraise)

Select and use various time management techniques including publishing agendas with time limits on each entry, adhering to agenda etc. (Practice)

Usage of tools like Brainstorming, Nominal group technique, multi-voting (Practice)

Select and use tools like Affinity diagram, Tree diagrams, PDPC, matrix diagrams, interrelationship digraphs, prioritization matrix, Activity network diagram. (Practice)

Measure team progress in relation to goals & objectives.(Analyze)

II. SIX SIGMA APPROACH - DEFINE (20 QUESTIONS)

Segmentation and Voice of Customer (VOC)

Segment customers for each project and show how the project will impact both internal and external customers. (Practice)

Identify and select the appropriate data collection method (Surveys, Focus groups, interviews, observations, etc.) To gather customer feedback for better understanding of customer needs, expectations and requirements. (Practice)

PROGRAM CONTENTS

Define, select, and use appropriate tools to determine customer requirements, such as CTQ flow-down, quality functions deployment (QFD) and the Kano Model. (Practice)

Develop Project charter and Project execution Plan

Develop and evaluate the problem statement in relation to the project's baseline performance and improvement goals. (Construct)

Develop and review project boundaries to ensure that the project has a value to the customer. (Analyze)

Identify and evaluate performance measurements (e.g. Cost, revenue, schedule, etc.) that connect critical element of process to key outputs. (Analyze)

Identify, develop and use project management tools, such as schedules, Gantt charts, tollgate reviews, etc., to track project progress. (Construct)

III. SIX SIGMA APPROACH - MEASURE (30 QUESTIONS)

Process Documentation

Identify process variables and evaluate their relationships using SIPOC and other tools. (Appraise)

Evaluate process flow and utilization to identify waste and constraints by analyzing work in progress (WIP), work in queue (WIQ), touch time, takt time, cycle time, throughput, etc.(Appraise)

Analyze process by development and using value stream maps, process maps, flowcharts, procedures, work instruction, spaghetti diagrams, circle diagrams, etc. (Analyze)

Collecting & Summarizing Data

Define, classify and evaluate qualitative and quantitative data, continuous (variable) and discrete (attributes) data and convert attributes data to variables measures when appropriate. (Appraise)

Define and apply nominal, ordinal, interval and ratio measurement scales. (Practice)

Define and apply the concepts related to sampling (e.g. Representative selection, homogeneity, bias, etc). Select and use appropriate sampling methods (e.g., Random Sampling, Stratified Sampling, Systematic Sampling, Linear Sampling, etc.) That ensure the integrity of data.(Appraise)

Develop data collection plans, including consideration of how the data will be collected (e.g., Check sheets, data coding techniques, automated data collection, etc.) and how it will be used. (Practice)

Understand & Explain measurement methods for both continuous and discrete data. (Comprehension)

Measurement System Analysis

Use various analytical methods (e.g. Repeatability and Reproducibility (R&R), Correlation, bias, linearity, precision to tolerance, percent agreement, etc.) to analyze and interpret measurement systems capability for variables and attributes measurement systems. (Appraise)

Identify how measurement systems can be applied in Marketing, sales engineering, R&D,, supply chain management, customer satisfaction and other functional areas.(Comprehension)

Understand & Explain elements of metrology, including calibration systems, traceability to reference standards, the control and integrity of standards and measurement devices, etc (Comprehension)

Basic Statistical Analysis of Data

Define and distinguish between population parameters and Sample statistics (e.g., Proportion, mean, standard deviation, etc.) (Practice)

PROGRAM CONTENTS

Describe and use this theorem and apply the sampling distributions of the mean to inferential statistics for confidence intervals, control charts, etc. (Practice)

Calculate and interpret measures of dispersion and central tendency and construct and interpret frequency distributions and cumulative frequency distributions. (Appraise)

Construct and interpret diagrams and charts, charts including box-and-whisker plots, run charts, scatter diagram, histograms, normal probability plots, etc. (Appraise)

Define and distinguish between descriptive and inferential statistics studies and evaluate their results draw conclusions. (Appraise)

Describe and apply Probability concepts. (Practice)

Describe, apply and interpret Normal, Poisson, binomial, chi-square, student's t and F distribution. (Appraise)

How and When to use Hypergeometric, Bivariate, Exponential, Lognormal, and Weibull. (Practice)

Define, Select and Calculate Cp and Cpk to assess process performance. (Appraise)

Define and calculate Pp, Ppk and Cpm to assess process performance. (Appraise)

Describe assumptions made for when short term or long term data is available. Interpret relations between short term and long term capability. (Appraise)

Non-normal data and identify when to use Box-cox or other transformation techniques. (Practice)

Calculate process capability and process sigma level for attributes data (Practice)

Describe and apply elements of designing and conducting process capability studies. (Appraise)

Distinguish between natural process limits and specification limits, and calculate process performance metrics such as percent defective, parts per million (PPM), DPMO, DPU, Process Sigma, rolled throughput yield (RTY), etc. (Appraise)

IV. SIX SIGMA APPROACH - ANALYZE (25 QUESTIONS)

Calculate and interpret the correlation coefficient and its confidence interval, and describe the difference between correlation and causation. (Analyze)

Calculate and interpret Regression analysis (Linear model only), apply and interpret hypothesis tests for regression statistics. Use the regression model for estimation and prediction, analyze the uncertainty in the estimate, and perform a residuals analysis to validate the model. (Appraise)

Use and interpret multi variate tools such as principal components, factor analysis, discriminant analysis, Multiple analysis of Variance (MANOVA), etc., to investigate sources of variation. (Analyze)

Use and interpret Multi-vari charts and determine the difference between Positional, Cyclical and Temporal variation. (Analyze)

Analyze attributes data using logit, probit, logistic regression, etc to investigate sources of variation. (Analyze)

Hypothesis testing - Define and interpret the significance level, power, type I and type II errors of statistical tests. (Appraise)

Equality of means and proportions. (Practice)

Define & distinguish between confidence and prediction intervals. Define & interpret the efficiency and bias estimators, tolerance and confidence intervals, Hypothesis testing for means, variance, and proportions. (Appraise)

PROGRAM CONTENTS

ANOVA & Chi Square tests.

(Appraise)

Use contingency tables to determine

statistical significance.(Appraise)

Non-parametric test like, Mood's median,

Levene's test, Krushal-wallis, Mann Whitney, Etc. (Appraise)

FMEA, distinguish between PFMEA and DFMEA. (Appraise)

Root cause analysis using tools like 5 why's, pareto chart, fault tree analysis

cause and effect diagrams, etc.)for resolving critical problems.(Appraise)

Identify 7 types of waste (Overproduction, Inventory, Defects,

Over-processing, Waiting, Motion, and Transportation). (Appraise)

V. SIX SIGMA APPROACH - IMPROVE (25 QUESTIONS)

Basics of Design of Experiment (DOE). Understand terms like dependent and independent variables, factors, and levels, response, treatment and error etc. (Comprehension)

Define and apply DOE principles, including power and sample size , balance, repetition, replication, order, efficiency, randomization, blocking interaction, confounding, resolution, etc. (Practice)

Design and conduct completely randomized, randomized block, and Latin square designs and evaluate their results.(Appraise)

Determine the effects of confounding to this experiments.(Appraise)

Full factorial experiments. (Appraise)

Tools and techniques for preventing or eliminating waste, like pull system, kanban, 5S, standard work, poka-yoke etc. (Analyze)

Use techniques for reducing cycle time using Continuous flow, SMED etc. (Analyze)

Kaizen, Kaizen Blitz and Theory of Constraints. (Comprehension)

Develop plans to implement Solution through simulation, pilot run etc. (Appraise)

VI. SIX SIGMA APPROACH - CONTROL (20 QUESTIONS)

Understand & Explain the objective of SPC, including monitoring and controlling process performance, tracking trends, runs, etc, and reducing variation in a process. (Comprehension)

Rational Subgrouping. (Appraise)

Select and apply control chart like individual and moving range chart (ImR), p, np, c, u, short - run SPC and Moving average. (Practice)

Interpret control charts and distinguish between common and special cause of variation. (Analyze)

Total Productive Maintenance (TPM), Visual Factory. (Comprehension)

Control Plan, develop control plan to sustain the solution, including transfer of responsibility from project team to the process owner. (Practice)

Document the sustained improvements.(Practice)

Develop and implement SOPs, work instructions, etc., (Practice)

VII. SIX SIGMA APPROACH - DFSS (10 QUESTIONS)

Identify and describe DMADV (Define, Measure, Analyze, and Validate), DMADOV (Define, Measure, Analyze, Design, Optimize and validate)

Explain design constraints, like Design for Cost, Design for Manufacturability and producibility, design for Test, Design for Maintainability etc., (Comprehension).

Explain Robust Design, Tolerance and statistical tolerancing. (Comprehension)

Explain tools like, Pugh Analysis, Porter's Five Force analysis etc.(Practice)

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