CERTIFIED
SIX SIGMA BLACK BELT

SIGMA PLUS INDUSTRIAL SOLUTIONS

Sigma+
Industrial Solutions

Six Sigma Black Belt Program

The Six Sigma Black Belt (CSSGB) program course from Sigma plus Industrial Solutions is considered to be a guidance in managing high scales of improvement projects, which will improve your skills to manage your employment liabilities and responsibilities in a more efficient way, and shall have a positive impact on your working organization.

Examination

Each certification candidate is required to pass the online examination that consists of multiple-choice questions that measure comprehension of the body of knowledge.

Required Experience

Six Sigma Black Belts are employees who spend some of their time on process improvement teams.

They analyze and solve quality problems, and are involved with Six Sigma, lean, or other quality improvement projects.

The Six Sigma Black Belt certification requires three years of work experience in one or more areas of the Six Sigma Belt Body of Knowledge.

Work experience must be a full-time, paid role.

Certified Six Sigma Green Belt (CSSGB)

In this body of Knowledge (BOK) include additional detail about the certificate six sigma black belt program and the cognitive level at which test questions are going to be written.

This information will provide guidance for the candidate preparing to require the exam.

The BOK t is meant to clarify the sort of content to be

included within the exam. The descriptor in parentheses at the top of every entry refers to the utmost cognitive level at which the subject is going to be tested.

Main Heading

I. Define Phase

- Select data collection methods and collect voice of the customer data and use customer feedback to determine customer requirements. (Analyze)
- Understand the elements of a project charter (problem statement, scope, goals, etc.) and be able to use various tools to track the project progress. (Understand)
- Develop a project problem statement and evaluate it in relation to baseline performance and improvement goals. (Evaluate)
- Develop and review project boundaries to ensure that the project has value to the customer. (Analyze)
- Identify specific, measurable, actionable, relevant, and time bound (SMART) goals and objectives based on the project's problem statement and scope. (Analyze)

- Identify and evaluate performance measurements (e.g., cost, revenue, delivery, schedule, customer satisfaction) that connect critical elements of the process to key outputs. (Analyze)
- Explain the importance of having periodic project charter reviews with stakeholders. (Understand)

II. Measure Phase

- Identify and use process flow metrics and analysis tools to indicate the performance of a process. (Analyze)
- Select, use, and evaluate various analysis tools such as value stream maps, process maps, flowcharts to better understand the running processes. (Evaluate)
- Develop and implement data collection plans that include data capture and processing tools, e.g., check sheets. (Analyze)
- Ensuring that collectors are trained in the tools and understand how the data will be used and checking for seasonality effects. (Analyze)

- Define and describe measurement system analysis tools e.g., use the gauge repeatability and reproducibility (R&R) studies and other MSA tools (e.g., bias, correlation, linearity, precision to tolerance, percent agreement) to analyze measurement system capability. (Evaluate)
- Use of basic statistics to distinguish between the population parameters and sample statistics (Apply)
- Explain the central limit theorem and its significance in the application of inferential statistics for confidence intervals, hypothesis tests, and control charts. (Understand)

- Calculate and interpret measures of dispersion and central tendency. (Evaluate)
- Construct and interpret diagrams and charts, e.g., box-and-whisker plots, scatter diagrams, histograms, normal probability plots, frequency distributions, cumulative frequency distributions. (Evaluate)
- Apply basic probability concepts and understand various

distributions. (Apply)

- Describe and apply probability concepts, e.g., independence, mutually exclusive events, addition and multiplication rules, conditional probability, complementary probability, joint occurrence of events. (Apply)
- Describe, interpret, and use various distributions, e.g., normal, Poisson, binomial, chi square, Student's t, F, hypergeometric, exponential, lognormal, Weibull. (Evaluate)
- Calculate statistical and process capability indices.
- Describe and apply elements of designing and conducting process capability studies relative to characteristics, specifications, stability, and normality. (Evaluate)
- Calculate the process capability and process sigma level for attributes data. (Apply)
- Distinguish between natural process limits and specification limits. Calculate process performance metrics, e.g., percent defective, parts per million (PPM), defects per million opportunities (DPMO), defects per unit (DPU), throughput yield, rolled throughput yield (RTY). (Evaluate)
- Describe and use appropriate assumptions and conventions when only short-term data or only long-term data are available. Interpret the relationship between short-term and long-term capability. (Evaluate)

III. Analyze Phase

- Use and interpret multivariate tools. (Evaluate)
- Perform hypothesis tests for means, variances, and proportions, and analyze their results.
- Define and interpret the significance level, power, type I, and type II errors of statistical tests. (Evaluate)
- Define, compare, and interpret statistical and practical significance. (Evaluate)
- Calculate sample size for common hypothesis tests: equality of means and equality of proportions. (Apply)
- Define and distinguish between confidence and prediction intervals. (Evaluate)
- Use and interpret the results of hypothesis tests for means, variances, and proportions. (Evaluate)

- Select, calculate, and interpret the results of ANOVAs. (Evaluate)
- Understand the importance of the Kruskal-Wallis and Mann-Whitney tests and when they should be used. (Understand)

V. Improve

- Define and describe terms such as independent and dependent variables, factors and levels, responses, treatments, errors, repetition, blocks, randomization, effects, and replication. (Understand)
- Calculate and interpret the correlation coefficient and its confidence interval and describe the difference between correlation and causation. (Evaluate)
- Calculate and interpret regression analysis and 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. (Evaluate)
- Define basic DOE terms, e.g., independent, and dependent variables, factors and levels, response, treatment, error, nested. (Understand)
- Define and apply DOE principles, e.g., power, sample size, balance, repetition, replication, order, efficiency, randomization, blocking, interaction, confounding, resolution. (Apply)
- Plan and evaluate DOEs by determining the objective, selecting appropriate factors, responses, and measurement methods, and choosing the appropriate design. (Evaluate)

- Use DOE and conduct completely randomized, randomized block, and Latin square designs, and evaluate their results. (Evaluate)
- Select and apply tools and techniques for eliminating or preventing waste, e.g., pull systems, kanban, 5S, standard work, poka-yoke. (Analyze)
- Use various tools and techniques for reducing cycle time, e.g., continuous flow, single-minute exchange of die (SMED), heijunka (production leveling). (Analyze)
- Define and distinguish between kaizen and kaizen blitz and describe when to use each method. (Apply)
- Develop plans for implementing proposed improvements, including conducting pilot tests or simulations, and evaluate results to select the optimum solution.

(Evaluate)

- Use cause and effect diagrams and other problem-solving tools to identify the true cause of a problem. (Analyze)

VI. Control

- Explain the objectives of SPC, including monitoring and controlling process performance, tracking trends, runs, and reducing variation within a process. (Understand)
- Select and use control charts in various situations: X-R, X-s, individual and moving range (ImR), p, np, c, u, short-run SPC, and moving average. (Apply)
- Interpret control charts and distinguish between common and special causes using rules for determining statistical control. (Analyze)

- Define the elements of visual controls (e.g., pictures of correct procedures, color-coded components, indicator lights), and describe how they can help control the improved process. (Understand)
- Assist in developing and implementing a control plan to document and monitor the process and maintain the improvements. (Apply)
- Define the elements of a visual factory and describe how it can be used to control the improved process. (Understand)

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