



Singapore
Quality
Institute
International

Certified Six Sigma Professionals

International Certification Courses
in Six Sigma Green Belt



*Internationally Licensed Course for
Process Improvement/Quality
Assurance Managers and Engineers*



Leading the Modern
Quality Movement in Pakistan



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Introduction

Six Sigma is an emerging Quality Improvement Tool with extensive power for improving performance of products, processes and systems of the organizations. The organizations looking for breakthrough improvement in their organizations cannot ignore this program.

Unlike ISO 9000 where the focus is on standardization, Six Sigma teams build management teams in organizations, who are developed with exhaustive problem solving and analytical tools, statistical tools, process improvement tools, and process control tools. Creating these unique capabilities, overall enterprise improvement methodology is deployed in organizations to reduce product or services failure rates to near zero levels. Utilizing a disciplined, data-driven approach, Six Sigma practitioners collect and use various data like customer feedback, product inspection results, process parameters, key performance indicators and their long term trends, supplier performance results in the supply chain etc. to monitor, control, and improve operational performance by eliminating and preventing defects in products / and associated processes, including management, service delivery, production and customer satisfaction.

What is Six Sigma Green Belt?

Six Sigma Green belt is a middle level six sigma program. It aims to provide medium level capabilities to run six sigma projects in the companies. Six Sigma Green Belts are the professionals from Quality and Process Improvement departments who work under the guidance of Six Sigma Black Belt in various problem solving and quality improvement activities in the six sigma program being run in organizations. A company which embarks on six sigma strategy needs a number of green belts, who form part of six sigma project teams. These teams work on business and quality improvement projects in their respective organizations. This course is conducted by PIQC in collaboration with Singapore Quality Institute International Singapore (SQII).

Who is Six Sigma Green Belt?

Six Sigma Green Belts serve Process Improvement Projects. They collect and analyze data, develop process maps, assigned the tasks of certain level of statistical analysis and developmental designs for a particular project. Six Sigma Green Belts can also be assigned specific improvement projects to be conducted as their own-projects that would not require statistical rigor demonstrated by Six Sigma Black Belts.

Six Sigma Green Belt Real Life Projects

This is one of the most practical courses in Quality and includes a number of Quality tools and approaches. The course is specially designed to provide practical exposure to participants with practical projects and hands on experiences on advanced statistical software packages so that they are useful in their companies from practical point of views and can help building the companies to the world-class level.

Course Instructors

Internationally qualified and experienced Six Sigma Black Belts. All the course instructors are approved tutors by Singapore Quality Institute and they have worked in number of Six Sigma projects in the companies.

Six Sigma: Body of Knowledge and Topics

The body of knowledge of this course is compatible to the one defined by the American Society of Quality – ASQ®. The instructors and the teaching methodology are also ensured to the highest level. The following is the guidelines of the topics to be covered in the course.



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1. ORGANIZATIONAL PROCESS MANAGEMENT & MEASURES

A. Introduction to Six Sigma

Detailed introduction with Analytical discussion

B. Impact on stakeholders

Describe the impact six sigma projects can have on customers, suppliers, and other stakeholders.

C. Critical to Quality CTQ requirements

Define and describe various (critical to quality (CTQ) and the importance of aligning projects with those requirements.

D. Business Performance Measures

Define and describe various business performance measures, key performance indicators (KPIs), the financial impact of customer loyalty, etc.

II. TEAM MANAGEMENT

A. Team Formation

1. Team Types and Constraints

Define and describe various types of teams and determine what team model will work best for a given situation.

2. Team Roles

Define and describe various team roles and responsibilities, including leader, facilitator, coach, individual member, etc.

3. Team Stages

Facilitate the team through the classic stages of development; forming, storming, norming, performing, and adjourning.

4. Team Communication

Identify and use appropriate communication methods (both within the team and from the team to various stakeholders) to report progress, conduct milestone reviews, and success of the project.

B. Team Dynamics

Identify and use various techniques (i.e., coaching, mentoring, intervention, etc.) to overcome various group dynamic challenges, including overbearing / dominant or reluctant participants, feuding and other forms of unproductive disagreement, unquestioned acceptance of opinions as facts, groupthink, floundering, rushing to accomplish or finish, digressions, tangents, etc.

III. DEFINE

A. Project Charter

1. Problem Statement

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

2. Project Scope

Develop and review project boundaries to ensure that the project has value to the customer

3. Goals and Objectives

Develop the goals and objectives for the project on the basis of the problem statement and scope.

B. Project Tracking

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

IV. MEASURE

A. Process Characteristics

1. Input and output variables

Identify these process variables and evaluate their relationships using SIPOC and other tools

2. Process Flow Metrics

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

3. Process Analysis Tools

Analyze processes by developing and using process maps, flowcharts, procedures, work instructions, etc.

B. Data Collection

1. Types of Data

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

2. Measurement Scales

Define and apply nominal, ordinal, interval, and ratio measurement scales.

3. Collecting Data

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

C. Measurement Systems

1. Measurement Methods

Define and describe measurement methods for both continuous and discrete data.

2. Measurement Systems 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 system capability for variables and attributes measurement systems.



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D. Basic Statistics

1. Basic Terms

Define and distinguish between population parameters and sample statistics (e.g., proportion, mean, standard deviation, etc.)

2. Descriptive Statistics

Calculate and interpret measures of dispersion and central tendency, and construct and interpret frequency distributions and cumulative frequency distributions.

3. Graphical Methods

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

4. Valid statistical Conclusions

Define and distinguish between enumerative (descriptive) and analytic (inferential) statistical studies, and evaluate their results to draw valid conclusions.

E. Process Capability

1. Process capability indices

Define, select, and calculate Cp and Cpk to assess process capability

2. Process Performance Indices

Define, select, and calculate Pp, Ppk, and Cpm to assess process performance.

3. Short-term and Long-Term Capability

Describe and use appropriate assumptions and conventions when only short-term data or attributes data are available and when long-term data are available. Interpret the relationship between long-term and short-term capability.

4. Process Performance vs. Specification

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

V. ANALYZE

A. Measuring and Modeling Relationships Between Variables

1. Correlation Coefficient

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

2. Regression

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.

3. Multivariate Studies

Use and interpret charts of these studies and determine the difference between positional, cyclical, and temporal variation.

B. Hypothesis Testing

1. Terminology

Define and interpret the significance level, power, type I, and type II errors of statistical tests.

2. Statistical vs. Practical Significance

Define, compare, and interpret statistical and practical significance.

3. Tests for Means, Variances, and Proportions

Use and interpret the results of hypothesis tests for means, variances, and proportions.

C. Additional Analysis Methods Root Cause Analysis

Define and describe the purpose of root cause analysis, recognize the issues involved in identifying a root cause, and use various tools [e.g., the 5 whys, Pareto charts, fault tree analysis, cause and effect diagrams, etc.] for resolving chronic problems.

VI. IMPROVE

A. Design of experiments (DOE)

1. Terminology

Define basic DOE terms, including independent and dependent variables, Factors and levels, response, treatment, error, etc.

2. Design Principles

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

3. Planning Experiments

Plan, organize, and evaluate experiments by determining the objective, selecting factors, responses, and measurement methods, choosing the appropriate design, etc.

B. Implementation

Develop plans for implementing the improved process (i.e., conduct pilot tests, simulations, etc.), and evaluate results to select the optimum solution.

VII. CONTROL

A. Statistical Process Control (SPC)

1. Objectives

Define and describe the objectives of SPC, including monitoring and controlling process performance, tracking trends, runs, etc., and reducing variation in a process.



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2. Selection of Variables

Identify and select critical characteristics for control chart monitoring.

I. Control Chart Selection

Select and use the following control charts in various situations: X - R, X - s, individual and moving range (ImR), p, np, c, u, short-run SPC, and moving average.

ii. Control Chart Analysis

Interpret control charts and distinguish between common and special causes using rules for determining statistical.

B. Maintain Controls

1. Control Plan

Develop a control plan for ensuring the ongoing success of the improved process including the transfer of responsibility from the project team to the process owner.

C. Sustain Improvements

1. Lessons Learned

Document the lessons learned from all phases of a project and identify how improvements can be replicated and applied to other processes in the organization



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PIQC - Center for Excellence

Leading Institute in Pakistan providing professional education, certifications, training and corporate development in Quality Control (QC), Quality Assurance (QA) and Total Quality Management (TQM), Human Resource Management (HRM) and Health, Safety and Environment (HSE). Celebrating the 23rd year of its establishment, PIQC's vision is for Pakistan to be a hallmark of Quality in the national and global environment. With its leadership and team of specialists, it has provided corporate training and education to more than 40,000 students, managers and professionals. It is the pioneer and most authentic source for international Six Sigma and Lean training programs in Pakistan, including Six Sigma Yellow Belt, Six Sigma Green Belt and Six Sigma Black Belt.

PIQC has professional collaborations and linkages with various local and foreign organizations including Superior University, Hamdard University, NED University of Engineering and Technology, IQCS Certification, Singapore Quality Institute International (SQII), American Society for Quality (ASQ), and Quality and Productively Society of Pakistan (QPSP).

Degree Programs	Professional Diploma	International Certifications	Corporate Training	International Conventions
Masters & MPhil in: Quality Management Human Resource Management Industrial Management EHS Management	PIQC Certifications in Quality Management Project Management Software Quality Management Food Safety Management HSE Management Human Resource Management Labor Laws and IR Management	Internationally Renowned Certifications IRCA (UK) Accredited Certified ISO 9000 Lead Auditor Certified Six Sigma Green/Black Belt	Nation-wise seminars & workshops on Total Quality Management, Six Sigma, ISO 9000 Quality Assurance in Manufacturing, Services, Education, Banks and Healthcare, Total Productive Maintenance	Pakistan's 13th International Convention on Quality Improvement ICQI 2014 Nov 17-18 Lahore Theme Quality Leadership and Practices

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