CORE CONCEPT

Lean Six Sigma Black Belt Course for Industrial Processes: DMAIC, DOE and Process Control

Lean Six Sigma Black Belt Course for Industrial Processes: DMAIC, DOE and Process Control

Introduction:

Lean Six Sigma Black Belt for industrial processes, covering DMAIC, DOE and process control, is a 1-week course for process, production, quality and maintenance engineers who lead improvement projects in manufacturing, oil and gas, utilities and process plants, ending with a Black Belt Project Charter, Analysis Pack and Control Plan. Many plant improvement projects stall because measurements are untrusted, root causes are guessed and gains fade once the team moves on. Nominees already apply Green Belt tools at work, and teaching is by case study on industrial process data. CoreConcept Training Center delivers this Lean Six Sigma Black Belt course.

Course Objectives:

- Scope and charter industrial DMAIC projects with clear financial and operational benefits and sponsor agreement
- Validate measurement systems with gauge R&R and attribute agreement analysis before trusting plant data
- Assess process capability and stability with Cp, Cpk and control charts for continuous and batch processes
- Test root-cause hypotheses with ANOVA, chi-square, correlation and multiple regression on process data
- Plan and analyse full and fractional factorial designed experiments to set optimal process conditions
- Sustain gains with SPC, control plans, mistake-proofing and Lean tools, and coach Green Belt project teams

Target Audience:

- Process engineers responsible for unit performance and process improvement projects
- Production engineers responsible for throughput, losses and line performance
- Quality engineers responsible for capability, defects and customer complaints
- Maintenance and reliability engineers responsible for equipment-related losses
- Continuous improvement leads responsible for project portfolios and Green Belt coaching

Course Outline:

Day 1: Black Belt Role and Industrial DMAIC Define

- Black Belt Role, Project Selection and Portfolio Alignment
- DMAIC Project Charter With Financial Benefit Estimate
- SIPOC and Value Stream Map of a Plant Process
- Voice of Customer to Critical-to-Quality Tree
- Stakeholder Analysis and Sponsor Agreement for Plant Projects

Day 2: Measure Phase Statistics and Process Baseline

- Data Collection Plan and Sampling Strategy for Process Data
- Gauge R&R Study for Continuous Process Measurements
- Attribute Agreement Analysis for Inspection Decisions
- Process Capability Analysis With Cp, Cpk and Ppk
- Non-Normal Data Transformation and Capability Methods

Day 3: Analyse Phase Root Cause Statistics

- Hypothesis Testing Roadmap for Process Questions
- One-Way and Two-Way ANOVA on Production Data
- Chi-Square Tests for Defect and Failure Categories
- Correlation and Multiple Regression for Process Variables
- Multi-Vari Charts for Shift, Machine and Batch Effects

Day 4: Improve and Control With DOE and SPC

- Full Factorial DOE Planning and Analysis
- Fractional Factorial Screening Designs and Confounding
- Response Surface Concepts for Process Optimisation
- SPC Chart Selection and Out-of-Control Rules
- Control Plan, Mistake-Proofing and SMED for Sustained Gains

Day 5: Industrial Case Studies and the Project Pack

- Refinery Yield Case Study From Measure to Control
- Packaging Line Defect Case Study Using DOE Results
- Pump Failure Rate Case Study Using Regression
- Green Belt Coaching and Tollgate Review Simulation
- Black Belt Project Charter, Analysis Pack and Control Plan Completion

Skills You Will Gain:

- Project Chartering
- Measurement System Analysis
- Process Capability Analysis
- Hypothesis Testing
- Regression Modelling
- Design of Experiments
- Statistical Process Control
- Green Belt Coaching

Why Attend This Course:

- Deliver a Black Belt Project Charter, Analysis Pack and Control Plan to the plant manager and the continuous improvement steering group
- Decide which statistical test, experiment or control method answers each process question
- Avoid improvement projects that fail through untrusted data, guessed root causes or gains that fade
- Coach Green Belts and team members on the measurement, analysis and control methods practised in the case studies

Conclusion:

Back at work, the participant gives the Black Belt Project Charter, Analysis Pack and Control Plan to the plant manager, the process owner and the continuous improvement steering group. They use it to approve the project scope, the data and experiments needed and the controls that will hold the gain. After the first project closes, the organisation should check the financial benefit, capability and control chart stability against the charter and decide which Green Belt projects the Black Belt leads next.

Frequently Asked Questions FAQ:

What should participants know before a Lean Six Sigma Black Belt course for industrial processes?

Participants should already use Green Belt tools such as process mapping, Pareto analysis and basic statistics, and be comfortable with statistical software or spreadsheets. Bringing anonymised process or defect data from their plant helps them apply the case studies to a live project.

How does a Lean Six Sigma Black Belt course for industrial processes differ from a Green Belt course?

Green Belt courses teach DMAIC basics for team members on smaller projects. This Black Belt course adds measurement system analysis, advanced hypothesis testing, regression and designed experiments, and prepares participants to lead complex plant projects and coach Green Belts.

Why is measurement system analysis essential in Lean Six Sigma Black Belt work on industrial processes?

If gauges, analysers or inspectors disagree, process data shows variation that is not real. Gauge R&R and attribute agreement studies prove the data can be trusted before capability, root cause or experiment results are used to change the process.

What do participants take back from the Lean Six Sigma Black Belt course for industrial processes?

Participants take back a Black Belt Project Charter, an Analysis Pack with MSA, capability, hypothesis tests, regression and DOE results, and a Control Plan with SPC and mistake-proofing, ready for their next plant project.