

Advanced Green Belt Programme

Substantial process improvements can frequently be brought about using the structured approach and the basic Lean Six Sigma problem solving tools (as covered on Level Green Belt training). However, sometimes you need more powerful tools. This may be after the low hanging fruit opportunities in your business have been addressed but some people will need these skills from the outset.

Advanced Green Belt consists of 3 modules

- Green Belt (described in the Green Belt Flyer)
- Process Measurement and Control (described below, 3 days)
- Data Analysis Techniques (described below, 3 days)

The modules described below are based on Minitab statistical software which is used throughout. Minitab data files are provided.

Who is this programme for?

Green Belts who now need to upgrade their skill set, business analysts, quality professionals, engineers, scientists, business consultants, managers with process management responsibilities. In addition to the skills taught on the Green Belt Programme you would like to know how to:

- Present data to engage and influence your stakeholders
- Validate the integrity of your data
- Understand the right way and the right amount to sample a process
- Use Statistical Process Control (SPC) Charts to interpret and control processes
- Assess process capability (Cp/CpK)
- Use the appropriate metrics for reporting and improvement
- Analyse process data using a variety of hypothesis and regression tests
- Make decisions with data – correctly!

What will you learn?

As well as building proficiency in the use of Minitab, this intensive course provides a solid grounding in these essential techniques:

- Process sampling
- Assessing measurement system performance
- Using Statistical Process Control Charts (SPC) to display and interpret the data
- Process Capability Analysis (Cp/CpK)
- Graphical Data Analysis
- Hypothesis Testing
- Simple and Multiple Regression Analysis
- Introduction to Logistic Regression and Design of Experiments
- The background statistical knowledge to correctly apply, interpret and communicate the above

What are the key outcomes?

Outcomes for your business:

These powerful tools will enable your improvement projects to take performance to the next level and promote the development of a data based decision making in your organisation.

Outcomes for your personal development:

The ability to use data with confidence to understand and analyse processes and influence your colleagues. You can progress from here to Black Belt level by completing 2 remaining modules – Managing Change and Advanced Black Belt Tools.

How can I take the upgrade to Advanced Green Belt?

Each of the upgrade modules *Process Measurement and Control* and *Data Analysis Techniques* is a 3-day programme which we deliver frequently in-house and regularly via our open programme in London, Birmingham and Edinburgh.

Support Pack

All classroom delegates receive

- 12 months access to Catalyst's online **Business Improvement Zone** – over 200 short videos recorded live in the classroom covering the entire course content
- Printed and pdf copies of the course slides

Follow-on Options

You can upgrade from Advanced Green Belt to Black Belt with two or three additional modules

- Managing Change for Lean Six Sigma Projects
- Advanced Black Belt Tools
- Lean Six Sigma for Innovation and Design (Design for Six Sigma). This module is recommended by currently optional for BQF Black Belt certification

Other Options

- Project Coaching Support Service
- Lean Six Sigma Project Team Member e-learning training pack

Process Measurement and Control Module

Day 1:

- Introduction to Basic Statistics and Graphical Analysis using Minitab
- This session introduces Minitab and builds up your knowledge of the software (no previous experience required) using a case study. Tools include -
 - Frequency Plots
 - Scatter Plots
 - Pareto Charts
 - Time Series Plots

Day 2:

- Process Sampling with continuous and discrete (attribute and count) data
- Sample Size calculations for continuous and discrete data
- Measurement Systems Analysis
 - Gauge R&R Study
 - Attribute Agreement Analysis
- Recap of Understanding Variation and SPC, Tests for Special Causes
- Individuals (X-moving Range) SPC Charts
- Control Charts in Practice

Day 3:

- Statistical Thinking
 - The Normal Distribution
 - Normality Testing
 - Data Transformation and when to use it
 - Introduction to p-values
 - Central Limit Theorem
- Six Sigma Measures and Process Capability
 - DPU/DPMO and determining number of opportunities
 - Sigma Calculations
 - Capability Indices (Cp/CpK, Z)
 - Six Sigma Shift

Data Analysis Techniques

Day 1:

- Hypothesis Testing
 - T tests for comparing 2 groups
 - Type I and Type II Errors
 - Power and Sample Size
 - ANOVA and Test for Equal Variances for comparing multiple groups
 - Proportions and Chi Square tests for 2 or more groups – discrete data

Day 2:

- Regression Analysis
 - Linear Regression
 - Multiple Linear Regression and Model Building
 - Curvilinear regression
 - Introduction to Logistic Regression

Day 3:

- Control Charts
 - Charts for Attribute Data (p, np, c, u, Laney)
 - Charts for sub-grouped data (Xbar-R, Xbar-S, X-MR-R/S)
- Introduction to Design of Experiments – Factorial Experiments
- Case Study

Catalyst offers British Quality Foundation accredited Lean Six Sigma training from Awareness through to Master Black Belt level including workshops for Executive Teams and Project Champions.