

Advanced Green Belt Programme

6+4+2 days

Substantial process improvements can frequently be brought about using the structured approach and the basic Lean Six Sigma problem solving tools (as covered on 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.

The Advanced Green Belt upgrade consists of 3 modules

- Green Belt (described in the Green Belt Flyer)
- Data Driven Insights and Decisions (described below, 4 days)
- Process Measurement and Analysis Techniques (described below, 2 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

Learning 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.

Learning 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 Advanced Green Belt Upgrade?

The upgrade consists of two modules:

- Data Driven Insights and Decisions (2+2 days)
- Process Measurement and Control (2 days)

These modules are available through our open training programme as virtual classroom sessions.

The modules are also available as an in-house training class – either physical or virtual in a slightly different configuration (3 days + 3 days). In addition, they are also available as an on-line programme with video material covering all the technical content including detailed follow along instructions on using and interpreting Minitab.

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

Online 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
- Pdf copies of the course slides
- Access to a named tutor from the Catalyst team to support your learning

Follow-on Options

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

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

Other Options

- Project Coaching Support Service

Data Driven Insights and Decisions Content

- Introduction to Graphical Analysis (data visualisation)
 - Histograms, segmentation, Pareto, Scatter Diagram, Time Series Plots
 - Minitab skills
 - Principles for identifying Y and X measures including Types of Data
 - Operational Definitions
 - Analysing the measurement system for discrete data – Attribute Agreement Analysis (full training on Gauge R&R is covered in the Further Process Measurement and Analysis Techniques module)
 - Population and process sampling approaches
 - Sample size calculations and considerations
 - Process Control Charts for individual data points, sub-grouped data and attribute data
 - X/Mr
 - Xbar R/S
 - P/NP
 - C/U
 - Tests for special causes
 - Case studies
 - Process Capability for normal and non-normal data
 - Cp and CpK indices
 - Hypothesis Testing for continuous and attribute data whether 1, 2 or more groups within the data
 - T test
 - Anova
 - Proportions tests
 - Chi Square tests
 - Type 1 and 2 errors
 - Regression Analysis with continuous data
 - Simple linear regression
 - Residuals analysis
 - Prediction model
 - Working with Seasonal and Trending process data
- An introduction to process simulation

Further Process Measurement and Analysis Techniques Content

- Measurement Systems Analysis
 - Gauge R&R Study
 - Planning and running the study
 - Analysing the study
 - Gauge R Study
 - Gauge Linearity Study
 - Gauge Stability/Consistency
- Central Limit Theorem
- Combining distributions
- Box-Cox and data transformation
- Process Capability



- Cp/CpK with non-normal data
- Pp/PpK
- Z.bench
- Cpm
- Six Sigma Score and Sigma Shift (Method 2)
- Six Sigma Measures
 - DPU
 - DPMO and establishing Opportunities
 - Sigma Score (Method 1)
- Multiple Regression
 - Multicollinearity and VIFs
 - Rsq and Residuals Analysis
 - Model building
 - Factorial plots
 - Prediction
 - Curvilinear Regression
 - Adding categorical predictors
 - Transforming to improve the model
 - Introduction to Design of Experiments

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.