

Advanced Black Belt Tools

This module is taken after **Process Measurement and Control** and **Data Analysis Techniques** which are described in a separate document.

Advanced Black Belt Tools builds on the statistical toolset covered in the previous modules and adds advanced techniques including Design of Experiments, General Linear Model and Logistic Regression. These powerful tools will enable you to discover and understand the factors and factor-interactions which drive process performance in almost any business environment. As with all our statistical tools modules, we use Minitab software to do the hard work but you will further develop your confidence and ability to make decisions with data.

Other topics include dealing with seasonal data, non-parametric hypothesis tests, an introduction to process simulation using Simul8 software and the broader role of the Black Belt in the business.

Day 1:

Advanced ANOVA

- General Linear Model - ANOVA with 2 or more factors
- Main Effects and Interactions, co-variates

Further t-test topics

- Transforming data for robustness
- 1 sided tests and 1 sample tests

Non-Parametric Hypothesis Tests

Advanced Regression

- Regression model with continuous and discrete Xs
- Transforming data to improve the model
- Using the model

Introduction to stepwise and best subsets regression

Day 2:

Logistic Regression

- Single and Multiple Binary Logistic Regression
- Ordinal Logistic Regression

Design of Experiments

- Full Factorial and Fractional Factorial Experiments
- Planning and Designing the experiment - blocking, randomising and replication, practical considerations
- Analysing the Experiment – plots, residuals analysis, reducing the model
- Using the final model – response optimiser, predictions

Day 3:

Introduction to Process Simulation software

Time-Weighted Control Charts

Time Series and Seasonality

The broader role of the Black Belt

- Lean Six Sigma deployment, roles, project management and review, financials, Black Belt competencies

Revision Case Study – Covering the DMAIC phases from Define through to Control