SQT

TRAINING THAT DEVELOPS *REAL* CAPABILITY

# Statistics with Minitab (Incl. Regression Analysis and Stability)

CPI012

# Statistics with Minitab (Incl. Regression Analysis and Stability)

**This programme is available In-House and currently delivered through virtual classroom training.**

Note: This version of the three day course includes Regression Analysis and Stability Testing. There are two alternative versions; Statistics with Minitab (Incl. Capability Analysis), which includes Capability Analysis, Control Charts and Hypothesis Testing, and Statistics with Minitab (Incl. Gauge R&R and Sampling), which includes Gauge R&R and Acceptance Sampling. These alternative brochures are available on request. The tutors are available to discuss the differences between these alternatives, and also to discuss special programmes to meet specific customer requirements.

IT IS NOT POSSIBLE TO UTILISE SAMPLE DATA WITHOUT STATISTICS. Much time and effort is devoted to the collection of data in industry, for example; quality control measurements, data collected for validation of manufacturing processes, incoming and outgoing inspection data, data produced in the development of products in R&D, etc. It is not possible to get value from this data without using statistics. Many people who do actually use statistical tools such as Statistical Process Control, Design of Experiments, sampling standards, gauge R&R, and other applications don't understand the underlying statistics. This course is intended to provide that essential understanding so that people will choose the appropriate statistical tools for data analysis and understand the outcome of the analysis.

There are several brands of reasonably priced computer statistical software packages available to assist in the application of statistics, and most people with a reasonable background in maths (example, pass leaving certificate level) can be readily trained to use this software so as to utilise data for continual process improvement, and better decision making.

Minitab software will be used throughout the training course. Delegates will be trained to use both the main menus and the Assistant in Minitab to undertake the analysis that will be met in the Programme set out below. Where the course is presented in-company the programme can be modified to include specific statistical applications.

## Duration & Price

Duration: 3 days
Delivery mode: This programme is available In-Company

## Dates & Locations

*In-Company training programmes are customised for your organisations specific needs. Most In-Company training is now delivered virtually.*

## In-Company Training

Please contact us for more information on our In-Company training options

## What's covered?

**Day 1**

- Outline of the applications of statistics such as Statistical Process Control, Design of Experiments, Sampling, and the relationship with the underlying statistics
- Explanation of how statistics are used to obtain valuable information on processes from sample data
- Description of statistical terms including population, parameter, random sample, expected value
- Types of data – continuous (variables) and discrete (attributes) data
- Construction of a histogram and explanation of the meaning of frequency distributions, cumulative frequency distributions, measures of dispersion and central tendency
- Graphical methods – box-and-whisker plots, scatter plots
- The normal distribution – testing for normality – Anderson Darling and Ryan Joiner tests
- Normal and Weibull probability plots
- Dealing with non-normal data – Box-Cox and Johnson transformation, distribution fitting using Weibull, Smallest Extreme Value, Largest Extreme Value, etc.

**Day 2**

- Central limit theorem and sampling distribution of the mean
- Calculation of the confidence interval for the mean in variables and attribute data.
- Hypothesis testing – tests for means, variances and proportions – Z-test, t-test, 2-sample t-test, F-test, meaning of significance level
- Meaning of the P-value in hypothesis testing and how the rules for assessing P are derived
- Type I and Type II error – difference between statistical and practical significance
- Sample sizes for hypothesis testing – the effect on Power
- Goodness-of-fit tests

**Day 3**

- Analysis of variance (ANOVA) – analysis of a designed experiment illustrating the ANOVA – using Tukey's multiple-sample comparison to compare population means
- Simple and multiple linear regression and correlation. Calculation of the regression equation. Hypothesis testing of the regression statistics. Using the regression model for estimation and prediction. R-squared and R-squared adjusted – the difference between these two statistics.
- Stability studies – analyzing the stability of a product over time and determining the product's shelf life. Using Minitab to fit a linear model to represent the relationship between the response variable, the time variable, and an optional batch factor.

## Who should participate?

- Engineers, technicians, laboratory, R&D, and scientific staff
- All personnel involved in quality control
- All personnel who have a role in analyzing and understanding manufacturing and business data
- Inspection staff
- Personnel who use process improvement techniques in their work
- People planning to attend Six Sigma Black Belt training courses
- People studying for MBA's and other examinations involving statistics

A prior knowledge of statistics is not required, but participants should have an understanding of mathematical principles; for example, Leaving Certificate maths.

## What will I learn?

Participants achieve the following learning outcomes from the programme;

- Undertake statistical analysis using Minitab software
- Select appropriate statistical tests such as two-sample t, F-test, ANOVA, etc. for comparing data means and variances
- Calculate and interpret confidence intervals on population parameters
- Determine sample sizes for statistical tests
- Model data using regression analysis

## How do we train and support you?

**In-House Courses**

For In-House courses the tutor will contact you in advance to discuss the course programme in more detail in order to tailor it specifically for your organisation.

**Course Manual**

Delegates will receive a very comprehensive course manual written by the course tutors. The manual incorporates many exercises that the participants will complete during the training course, and these worked examples, along with the relevant graphical material, will serve as a useful reference when the participants return to their workplace.

## What software do we use?

Minitab will be demonstrated as part of the training so if delegates are in a position to bring along a laptop with Minitab 20, 21 or 22 pre-loaded (free 14 day trial of Minitab 22 available on www.minitab.com) they can utilise this during the training. If delegates don't have a laptop, they will still benefit greatly from the programme.

## Tutors

**Albert Plant**
View Profile

**Grainne Heneghan**
View Profile

## What Our Learners Say

We believe in excellence through transparency and continuous improvement. That's why we invite all our delegates to share their experiences on CourseCheck.com, an independent platform dedicated to genuine, unfiltered feedback. Learner insights help us not only to enhance our training programmes but also empower potential learners to make informed decisions. Click on the link below to read firsthand experiences and testimonials from past learners.


Click Here

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SQT provide a unique combination of high quality, accredited, practical training delivered by leading industry experts and supported by the most up to date learning technology and tools

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QQI AWARD | IEMA Transforming the world to sustainability - APPROVED - | CompEx Part of the JTL Group | FSPCA Food Safety Preventive Controls Alliance | CQI IRCA Approved Training Partner | Chartered Institute of Environmental Health

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