SQT

TRAINING THAT DEVELOPS *REAL* CAPABILITY











Statistics with Minitab (incl. Gauge R&R and Sampling)

CPI011

Statistics with Minitab (incl. Gauge R&R and Sampling)

Note: This version of the three-day course includes Gauge R&R and Acceptance Sampling. 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. Regression Analysis and Stability), which includes Regression Analysis, Stability Studies, and Power of the Test. These alternative brochures are available on request. The tutors are available to provide more details on the various alternatives, and to discuss special programmes to meet specific customer requirements.

Summary of content of this course

- Minitab software
- Introductory statistics
- Capability analysis
- Control charts
- Gauge R&R
- Acceptance sampling – including use of Minitab to design sampling plans

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 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 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.
- Capability analysis – CPk/Ppk and percent out of specification

Day 2

- Central limit theorem and sampling distribution of the mean
- Control charts for variables
- Explanation of the role of control charts in capability analysis and explanation of why there is a difference between Cpk and Ppk
- Carrying out a Gauge R&R (Repeatability and Reproducibility) study. Explanation of how to set up and undertake the study. Classroom exercise with Minitab calculating and analysing the results of a R&R study using both the ANOVA and the Average and Range method. Explanation of the general rules of acceptability for R&R in a measuring system.
- How to improve the performance of the measurement system when the Gauge R&R is excessive.

Day 3 – Acceptance Sampling for Attributes and Variables

- Explanation of sampling inspection system terminology including; acceptance quality limit (AQL), LTPD (Lot tolerance Percent Defective), RQL (Rejectable Quality Level), inspection levels, attributes, variables, probability of acceptance, operating characteristic (OC) curve, random sampling
- Choosing sample sizes for validation studies and inspection

- The correct approach to determining the acceptance quality limit (AQL)
- Identifying the appropriate inspection level and sample sizes in the sampling tables, such as ANSI Z 1.4
- Exercises in the use of the sampling tables selecting the appropriate sampling plans for inspection by attributes and variables. How the tables are used to decide on acceptance or rejection of a lot
- Switching Rules and how they are used
- Using Minitab software to design specific sampling plans

Who should participate?

- Validation engineers and scientists
- Process engineers
- All personnel involved in quality control including personnel choosing sample sizes for incoming and outgoing inspection

A prior knowledge of statistics is not required, but participants should understand 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
- Calculate and interpret capability analysis – CP/Cpk and PP/Ppk
- Construct and use control charts
- Undertake and interpret Gauge R&R Studies
- Choose sample sizes for validation work and inspection

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 tutor. 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.



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