

STATISTICAL TOOLS FOR ANALYTICAL QUALITY ASSURANCE

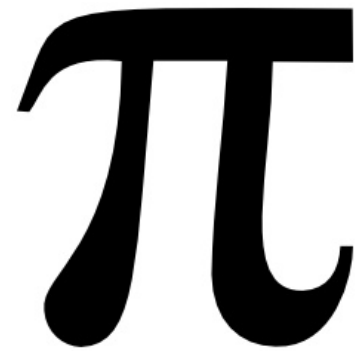
SAVANT TECHNOLOGIES

This workshop is designed for technical staff who need an introduction to the statistical tools that will help them to ensure the quality of test results produced by their laboratory. It gives instruction and practice through presentations and worked exercises, and there is opportunity for discussion of the application of the techniques considered in delegates' own laboratories.

The workshop will introduce delegates to some of the underlying assumptions of the statistics commonly used in laboratories and enable them to make and compare estimates of the precision, and bias of test methods, and to assess detection capability. Guidance is given on the construction and effective use of control charts and, optionally, some approaches to defining and detecting outliers in laboratory data can be included. The duration and content of the workshop can be adjusted to suit delegates' requirements.

The guidance given and techniques explained are based on materials drawn from International Standards on statistics, on guidance documents from organisations such as Eurachem and from statistics textbooks. This information is then explained and illustrated in contexts and applications that will be understood by laboratory staff. This workshop is complimented by others offered by **Savant Technologies** on Measurement Uncertainty and Method Validation.

The workshop is structured into short presentations and example exercises. Materials are available for use in Microsoft Excel where delegates have access to computers. Workbooks are provided that contain notes on the presentations, example exercises and answers and references to useful books and resources.



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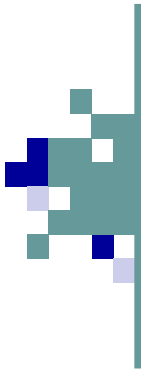
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STATISTICAL TOOLS FOR ANALYTICAL QUALITY ASSURANCE

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Course Content

Definitions and Assumptions

- ◇ An introduction to populations, samples and distributions.
- ◇ What is meant by confidence or degrees of freedom?
- ◇ Using calculators, computers and statistical tables

Trueness

- ◇ What are trueness and bias?
- ◇ How to estimate means and their confidence limits.
- ◇ Deciding whether apparent differences are real using significance tests.
- ◇ The assumptions that must be made.

Precision

- ◇ Defining repeatability and reproducibility.
- ◇ Working with and comparing standard deviations
- ◇ How to make estimates of precision and of maximum expected differences between duplicates
- ◇ How to update precision estimates with additional data.
- ◇ The assumptions that must be made.

Detection Capability

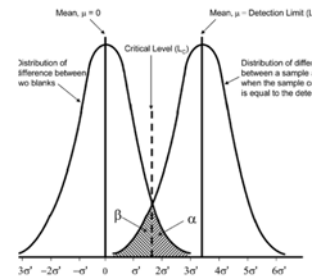
- ◇ Defining detection capability and limit of detection
- ◇ Estimating from blank variability
- ◇ Estimating from linear regression

Quality Control Charts

- ◇ What is a Shewhart Chart?
- ◇ Monitoring precision and accuracy with control charts.
- ◇ How to calculate and update action limits
- ◇ Calculating initial action limits
- ◇ Updating action limits
- ◇ Interpreting control charts

Outliers

- ◇ What is an outlier?
- ◇ Using Cochran's test to identify outliers..



1. Illustration of the relation of the criterion of detection (critical level) a ion (detection limit). Errors of the first kind (false negatives) are represented by α , whereas errors of the second kind (false positives) are represented by β . (from Currie 1984)

PUBLIC COURSE TRAINING

CLOSED COURSE AND ON-SITE CLASSROOM TRAINING

SIDE BY SIDE TUITION

SPREADSHEET BASED TRAINING

DESIGN OF QUALITY ASSURANCE SYSTEMS

COMPUTER BASED SOLUTIONS

STATISTICAL CONSULTANCY

ADVANCED TOPICS ALSO AVAILABLE:

REGRESSION TECHNIQUES

ANALYSIS OF VARIANCE

ESTIMATION OF MEASUREMENT UNCERTAINTY

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