

Analytical quality
training programme **2016**



Method validation

Laboratory accreditation

Measurement uncertainty Data analysis

Quality management systems

Statistics

Experimental design

Proficiency testing

Laboratory internal audit



Quality

Accreditation

Recognition

Personal data

Accreditation

Confidence

Method validation

Excel Measurement uncertainty

Quality systems Personal development Quality systems

Statistics

Personal development

Personal development Quality systems

Proficiency testing ISO 17025

Measurement uncertainty

Experimental design

Method validation

Experimental design

Quality systems ISO 17025

Personal development

Excel

Experimental design

Performance

Quality ISO 17025 Reliability

Analytical data

Measurement uncertainty

Personal development Assurance

Analytical data

Measurement uncertainty

ISO 17025

Pharmaceutical

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Global quality management solutions for the laboratory

LGC provides products and services to improve measurement and quality control within your laboratory.

Standards, a division of LGC, is a high quality manufacturer and distributor of:

- Certified and analytical reference materials
- Pharmaceutical impurities
- Drug standards
- Biological standards
- Proficiency testing schemes for the pharmaceutical, forensics, clinical, life sciences, environmental, food and industrial market sectors.

Why choose LGC?

- **Widest range of reference materials** to purchase online using an intuitive search engine to find the product you require from our online range of over 56,000 reference materials.
- **Access to over 1,500 proficiency testing exercises** serving more than 9,000 laboratories, producing in excess of 250,000 test materials which are distributed to more than 150 countries worldwide.
- **Expert technical support** on product usage and selecting the appropriate material for your needs.
- **Network of international offices** offering customer service in your local language and time zone.
- **Access to knowledge** on import requirements, licensing, shipping regulations and controlled substances management.



Further information at www.lgcstandards.com

@LGCStandards

Training course calendar 2016

January

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31						

February

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March

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April

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May

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June

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July

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31						

August

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September

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30	31					

November

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December

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- Statistics for analytical scientists
- Further statistical tools for analytical scientists
- Designing effective experiments
- Using Excel spreadsheets for data analysis in testing laboratories
- Evaluating measurement uncertainty for chemical testing laboratories

- Method validation
- Introduction to method validation for biologists
- Understanding ISO/IEC 17025 – requirements for analytical laboratories
- Laboratory management - role of the quality manager and technical management
- Laboratory internal audit

Our training courses

At LGC, providing our customers with high quality analytical products and services is an integral part of what defines the organisation. As such, we are committed to providing first-rate training courses for analytical scientists. With 18 years' experience in delivering analytical quality training programmes worldwide, our team of professionals will help ensure you meet current quality standards by providing:

- A programme of scheduled courses written and delivered by expert analytical scientists ensuring up-to-date information on current accreditation and regulatory issues
- Best practice training for all laboratory personnel, whether working at the bench or in management
- Courses relevant to the laboratory environment with focus on application rather than theory
- Comprehensive course packs; a vital reference source
- Opportunities to practise newly acquired knowledge through laptop-based workshop sessions using Excel
- 'Off-the-shelf' and bespoke training solutions delivered at LGC headquarters or your own location.

Our scheduled courses are detailed in this brochure and provide training in key areas of analytical quality assurance, including statistics, method validation and estimation of measurement uncertainty.

On-site and bespoke training programmes

We recognise that the needs of each individual company may differ so a customised solution is often required. Whether you are looking to develop measurement capability in a new laboratory, or you are an established laboratory seeking to maintain or extend your current accreditation, then our customised and on-site training may be the most cost effective and practical answer.

We can deliver any of the LGC courses listed in this brochure at your own location. We can also work with you to create a customised training and consultancy programme to fulfil your development objectives. This programme can include topics such as traceability, reference material production and technical training in chemical and bioanalytical techniques such as mass spectrometry and PCR.

A wealth of experience in analytical quality training

LGC has delivered over 250 analytical quality training courses for at least 400 different organisations from 30 countries at our headquarters in the UK and locations all over the world. We monitor feedback from delegates for identification of new course topics, and review our training material to reflect changes to analytical quality requirements.

LGC is a **Cogent assured provider**, a status awarded in recognition of training that supports science industry employers in attracting, retaining and developing the best people. Cogent has an assured network of training providers who meet rigorous standards to ensure the highest quality training provision.



Why attend an LGC analytical quality training course?

Analytical quality is of paramount importance for the chemical and biological sciences in order to make sound decisions based upon measurement results. The need to meet increasingly stringent regulatory and quality requirements has resulted in greater emphasis on method validation, evaluating measurement uncertainty and establishing the traceability of results. This is reflected in the international accreditation standard ISO/IEC 17025, used as the basis for establishing the competence of testing and calibration laboratories by national accreditation bodies.

Attending LGC's training courses will help you meet current accreditation and regulatory requirements and give your customers confidence in the quality of the data you produce. In addition, companies which invest responsibly in the development of the skills of their staff maximise their business opportunities. Those individuals with enhanced skills are better placed to take advantage of workplace opportunities, helping to build a rewarding career and contribute to their futures.

Our team of trainers has extensive experience of analytical quality assurance, with expertise in method validation, measurement uncertainty, traceability, reference materials and proficiency testing. This ensures that our training remains topical and can be tailored to meet the needs of individual organisations.

All our courses consist of presentations and workshop sessions to stimulate group discussion and to give the opportunity to practise newly acquired knowledge. Where relevant, delegates will use laptops running Excel to facilitate data analysis. To ensure maximum benefit, delegates work in small groups with one or more tutors present during the workshops.

To provide value for money for our customers we offer discounts for group bookings (see page 9).

In the UK, LGC has also agreed a reciprocal programme of training with UKAS (United Kingdom Accreditation Service) to extend both organisations' range of training courses. As part of this agreement, the UKAS courses listed in this brochure can be booked through LGC.

For further details, or to register for a course, please contact Bernadette Francis:

**LGC Training Centre, Queens Road,
Teddington, Middlesex, TW11 0LY**

Email: training@lgcgroup.com

Tel: +44 (0)20 8943 7631

Fax: +44 (0)20 8943 2767

Web: www.lgcgroup.com/training



Our customers

LGC has worked with a wide range of organisations in different sectors including chemical manufacturing, pharmaceuticals, environmental and food analysis, utility services and academia. A significant number of our customers return to us for further courses.

Our customer list includes



Augean PLC • AWE • Barts Health NHS Trust • Dundee City Council • Envirolab
EuroCaps • EXPRO • F2 Chemicals Limited • Glasgow Scientific Services
Home Office Science - Centre for Applied Science and Technology • Hong Kong Accreditation Service
Huntsman • Ipsen • Johnson Matthey (Emission Control Technologies)
Lancashire County Scientific Services • New Victoria Hospital • Portsmouth Water
Saudi Food and Drug Authority • Scotland's Rural College • South West Water • University of Lincoln

Customer feedback

“Over 95% of respondents feel that our training courses meet their expectations”

We collect and monitor feedback from all our courses. Over 95% of delegates who completed a feedback questionnaire stated that the training met their expectations and we consistently receive positive feedback on our courses:

“It is a very good course and covers a vast amount of information; the course guide will prove very valuable as a reference point”

A customer from the chemical testing sector on our **Measurement Uncertainty** course.

“I leave with precise training material and real life situations which will help me deliver a much better and consistent service as an R&D analyst!”

A customer from the food manufacturing sector on our **Method Validation** course.

“This course is very useful, I would recommend it to colleagues”

A customer from a scientific instrumentation company on our **Further Statistics** course.

“A very good and well taught course with the opportunity to apply knowledge to our own methods. Very valuable.”

A customer from a chemical testing company on a bespoke **Method Validation** course.

“This course is very good and I hope to use these techniques for future experimental work as soon as I return to the lab”

A customer from the R&D sector on our **Designing Effective Experiments** course.

“It was good, very clear and I feel a lot surer about the types of statistical analysis I need to be applying to my work and how best to interpret the results. The workshop sessions were very helpful”

A customer from the molecular biology sector on our **Introduction to Method Validation for Biologists** course.

“This is a very good training course. Brilliant lecturer, very coherent and understanding. She knew what she was talking about. I learnt more about stats today than I ever had and also when and where to use them”

A customer from the water testing sector on our **Statistics for Analytical Scientists** course.

“Great course, necessary for people needing accurate information on what is required for validation, especially for UKAS accredited testing”

A customer from the safety equipment manufacturing sector on our **Method Validation** course.

Our trainers

LGC trainers bring to our courses a wealth of knowledge and experience gained from their different technical backgrounds. Below are details of our core team of trainers.



Vicki Barwick has over 15 years' experience in the area of analytical quality and has considerable knowledge of method validation and the application of measurement uncertainty principles to analytical chemistry. Vicki has produced many training resources on analytical quality assurance and was a co-author of 'Quality Assurance in Analytical Chemistry', published by Wiley.



Malcolm Burns is LGC's Principal Scientist for food authenticity testing and the manager for the UK National Reference Laboratory for GMOs. He has over 10 years' experience delivering projects aimed at addressing the measurement issues associated with food authenticity and fraud, specialising in method validation, measurement uncertainty and standardisation of data analysis and interpretation.



Simon Cowen leads the statistics team at LGC and has 10 years' experience of providing statistical analysis and consultancy services to researchers and analysts, both within LGC and to external clients. His specialist areas include molecular biology and forensic DNA research, and the interpretation of forensic evidence. He has created and delivered several internal training courses for forensic scientists.



Steve Ellison is an international expert in measurement uncertainty. He is a co-author of the Eurachem/CITAC Guide 'Quantifying Uncertainty in Analytical Measurement'. Steve lectures throughout the world on measurement uncertainty, and is a member of a number of national and international networks and technical committees working on quality assurance and statistics for analytical chemistry.



Wayne Gaunt is a Technical Manager for the Chemistry department in the Proficiency Testing group at LGC, where he is directly responsible for the production, development and technical operations of a variety of proficiency testing schemes ranging from food chemistry to blood toxicology to consumer safety in toy products. He is a chartered analytical chemist with a degree in pure and applied chemistry.



Alan Handley is currently Head of Knowledge Exchange and Partnerships at LGC. He has over 30 years' experience in leading analytical operations in chemical laboratories. Alan is a former President of the Royal Society of Chemistry's (RSC) Analytical Division and he holds posts in various professional bodies. He has been awarded the RSC Distinguished Service Award for contributions to Analytical Chemistry by a non academic.



Jim Huggett is LGC's Principal Scientist for Nucleic Acid Research. Jim has over 15 years' experience in the genetics research area with a focus on the development of metrologically sound microbial analysis approaches for diagnostics purposes. Jim has an extensive publication record, is a major contributor to the MIQE guidelines and has co-edited the book "Molecular Diagnostics: Current Research and Applications".



Thierry Le Goff is a trainer in analytical quality and a consultant in ISO/IEC 17025 and ISO Guide 34. Prior to this, he managed LGC's calibration services where he led the development, validation and accreditation of new methods in accordance with ISO/IEC 17025 Calibration Status and the production and certification of reference materials in accordance with ISO Guide 34. Thierry has extensive experience in accredited laboratory management, quality management systems, method validation and measurement uncertainty.



Tracey Noblett has over 20 years' experience in microbiology, working in various fields including clinical, water and food testing. The past 10 years have been spent in the field of proficiency testing, and have included developing new schemes, provision of technical support, ensuring quality and gaining accreditation to ISO 43-1. Tracey is a member of the Eurachem Proficiency Testing Working Group.



Ulf Örnemark is an independent consultant in analytical quality. Prior to this he was LGC Standards' technical manager for clinical reference materials. He has a broad background in quality assurance including proficiency testing, uncertainty evaluation and quality management systems. Ulf is an authorised trainer of the Institute for Reference Materials and Measurements' (IRMM) TrainMiC programme and also advisor to the Swedish accreditation body (SWEDAC).



Elena Sanchez has a background in laboratory quality assurance and implementation of the ISO 17025 quality standard in molecular biology laboratories. She has extensive experience in DNA analytical techniques for commercial applications and in the implementation and validation of automated systems. Elena also has over 10 years' experience in training and workshop facilitation.



Matthew Whetton has over 15 years' experience working in the field of analytical chemistry using state of the art techniques for the analysis of phytochemicals and pesticides in food and environmental matrices. Matthew is the Head of Chemistry for the Proficiency Testing group at LGC Standards, where he is responsible for the production, development and technical operation of eighteen proficiency testing schemes in a diverse range of analytical fields.



Bernadette Francis is an experienced PA and has been providing administrative support to the training team for five years. Bernadette deals with all aspects of course administration including responding to enquiries, handling course bookings and facilitating the delivery of courses, both at LGC and externally.

About LGC

LGC is an international science-based company operating across a wide range of markets which underpin the safety, health and security of the public. We work with our customers in pharmaceuticals and biotechnology, food, agricultural biotechnology, sports and many other sectors, as well as with the government to achieve excellence in investigative, diagnostic and measurement science. Science for a safer world is at the heart of all we do.

LGC's origins can be traced back to 1842, as the Laboratory of the Board of Excise, founded to regulate the adulteration of tobacco. LGC was privatised in 1996 and still retains the unique function of the 'Government Chemist' which provides expert opinion, based on independent chemical and bioanalytical measurement, to help avoid or resolve disputes pertaining to food and agriculture.

As well as fulfilling key regulatory and advisory roles, we offer high quality laboratory services, products and consultancy solutions built upon the scientific and technical expertise of our staff:

- We are the designated UK National Measurement Institute (NMI) for chemical and bio-measurement, offering unparalleled expertise on matters related to standards, regulation and global measurement challenges to underpin growth in trade and support innovation.
- We host the MHRA (Medicines and Healthcare products Regulatory Agency) laboratory, responsible for ensuring the quality and safety of medicines in the UK.
- We test over 6,000 supplements, giving athletes the confidence that products are free from banned substances.



- We have played a key part in the BSE eradication programme, having tested over 3.6 million cattle in the UK since 2001.
- We are the UK's largest provider of forensic science, helping the criminal justice system through expert analysis of biological, chemical or physical samples.
- We offer over 100,000 reference materials and over 40 proficiency testing schemes worldwide to support laboratories in ensuring the quality of their measurements.

LGC has a proven track record in developing training resources and delivering training courses on quality assurance for our customers worldwide. The continued success of our courses is illustrated through the longevity of the analytical quality training programme. Our scientists have also collaborated on the development of a number of international documents on measurement uncertainty and method validation.

These are just a few examples of the work we do, for more information on the services and products we can offer visit: www.lgcgroup.com.

Course venues and group discounts

LGC's courses are held at our headquarters in Teddington, South West London, which are situated close to Bushy Park.

LGC

Queens Road
Teddington
Middlesex
TW11 0LY
UK

LGC's training venue is conveniently located for travel by either car (easily accessible from the M3, M4 & M25), rail (30 minutes direct from London, Waterloo) or air (30 minutes by taxi from Heathrow airport).

Detailed directions and a map will be sent to delegates prior to the course. Information on local accommodation will also be provided.

The courses listed in this programme that are provided by UKAS, are all held in Sunningdale Park.

UKAS – Sunningdale

Sunningdale Park
Ascot
Berkshire
SL5 0QE
UK

Group-booking discounts

If you have a number of staff who wish to attend a particular scheduled course we are pleased to offer the following group-booking discounts:

- **Second delegate: 5% discount**
- **Third delegate: 8% discount**
- **Fourth and subsequent delegates: 10% discount**

Discounts can only be applied to bookings made at the same time for the same course date.





Get in touch

If you want a taste of our course material, visit our website www.lgcgroup.com/training and look in our “Resource Centre” for free samples of our training material.

For further information about our training programme, or to register for a course, please contact:

Bernadette Francis
LGC Training Centre
Queens Road
Teddington
Middlesex
TW11 0LY
UK

Email: training@lgcgroup.com
Tel: +44 (0)20 8943 7631
Fax: +44 (0)20 8943 2767
Web: www.lgcgroup.com/training

If you would like to get up-to-date information about our training events, contact our training centre to be added to our mailing list or follow us on Twitter: LGC Training @sound_science

Find out how to get the most from your data by applying key statistical techniques

Ensuring the quality of analytical data is a vital aspect of the work of an analytical scientist. The effective planning of experiments and evaluation of data requires an understanding of statistics. Knowledge of statistics is also needed to carry out method validation and evaluate measurement uncertainty. This course is aimed at analysts and covers the statistics most commonly applied to analytical data. It will allow analysts to answer questions such as, 'Which is the best way to summarise my data?', 'Is there a real difference between the results produced by different test methods?', 'How should I evaluate the results obtained from an instrument calibration experiment?' The course includes laptop-based workshops using Excel.

Who should attend?

The course is aimed at analysts who need to evaluate data or carry out tasks such as method validation and uncertainty estimation.

The course focuses on the practical application of statistical techniques and is suitable for those with limited or no prior experience of statistics.

What are the benefits?

This course will help you:

- Understand some of the most important statistical concepts used by analytical scientists
- Calculate the most commonly used statistical parameters
- Carry out significance tests to identify differences between sets of data
- Use linear regression in calibration
- Use Excel functions for the analysis of data.

Contents

The course will cover:

- Introduction to statistics
- Significance testing: t- and F-tests
- Control charts
- Analysis of variance (ANOVA)
- Linear regression.

Course details

Dates	Code	Price
11 February 2016	TRSTAT40	£480 + VAT
15 September 2016	TRSTAT41	£480 + VAT





Further statistical tools for analytical scientists

1 day training course

Further your knowledge of the application of statistics to analytical science

Modern analytical instruments are capable of producing a large amount of data. To interpret this data effectively requires the application of statistics. This course builds on the topics covered in the 'Statistics for analytical scientists' course and includes some more advanced statistical tools. It will allow analysts to address issues such as identifying outliers in a data set, handling non-normal distributions of data and carrying out weighted and non-linear regression. The course includes laptop-based workshops using Excel.

Who should attend?

This course is aimed at analytical scientists who have to plan experimental studies and/or make decisions based on sets of data. It is suitable for those who have a basic knowledge of statistics.

What are the benefits?

This course will help you:

- Deal with normal and non-normal distributions
- Identify cases of normally distributed data with outliers
- Calculate statistical parameters in the presence of probable outliers
- Identify where two-way ANOVA is appropriate
- Use some of the more advanced regression tools
- Use Excel functions for the analysis of data.

Contents

The course will cover:

- Handling of non-normal data
- Dealing with outliers
- Robust statistics
- Fitting non-linear functions
- Weighted regression
- Two-way ANOVA with and without replication.

Course details

Dates	Code	Price
19 May 2016	TRFST25	£480 + VAT
10 November 2016	TRFST26	£480 + VAT

Designing effective experiments - principles of experimental design

2 day training course

Learn how to plan, execute and analyse efficient experiments

Modern analytical methods and production processes used in research and manufacturing are complex, with many different factors affecting the outcome. In order to be competitive, companies need to minimise resources expended on development and maximise process performance. Design of Experiments (DoE) enables these complex situations to be understood, reducing the cost of gaining an in-depth knowledge of the process which can be translated into competitive advantage. It is also a tool required by most of the regulatory agencies worldwide (including, for example, US Food and Drug Administration). DoE provides a well-structured method for determining the relationships between factors affecting the process under study.

Who should attend?

The course is aimed at analytical scientists and laboratory managers who need to plan experimental studies for analytical method development, or for product or process improvement, and who wish to develop an understanding of the main types of experiment used in industrial experimental design. The course is suitable for those who have a basic knowledge of statistics, including a basic understanding of significance testing, linear regression and analysis of variance.

What are the benefits?

This course will help you:

- Develop a systematic approach to experiments for scientific research, method development and product improvement
- Recognise and understand the advantages of the main types of experimental design
- Choose the most efficient experiment for each problem

- Understand how to interpret the results
- Apply the principles of experimental design during laptop-based workshops.

Contents

The course will cover:

- Doing the right experiment – setting objectives
- Simple experiments for single effects
- Estimating sample size for simple designs
- Strategies for reducing nuisance effects – randomisation, paired experiments and blocked designs
- Studying multiple effects – factorial designs
- Efficient screening experiments using fractional factorial designs
- Designs for optimisation – basic response surface models
- Analysing and interpreting designed experiments.

Course details

Dates	Code	Price
24 – 25 May 2016	TRDOE06	£850 + VAT
28 – 29 September 2016	TRDOE07	£850 + VAT





Using Excel spreadsheets for data analysis in testing laboratories

1 day training course

Make the most of your Excel package in the laboratory

Data analysis is a vital aspect of the work of an analytical scientist, and it is often facilitated by using Excel spreadsheets. Excel may be used to carry out the statistical analysis of data, automate the production of results and aid data trackability. The effective use of Excel for the evaluation of data requires an understanding of its functions and the correct use of statistics. This course is aimed at analysts and covers the main Excel functions commonly applied to data analysis. The course will include hands-on workshops using laptops to facilitate the application of theory.

Who should attend?

The course is aimed at analysts who are beginning to use Excel for tasks such as summarising data (using basic functions and formulas), producing calibration curves, or statistical analysis. The course will also be useful for anyone who is self-taught and looking to fill any gaps in their knowledge.

The course focuses on the practical application of Excel and is suitable for those with limited or no prior experience of using Excel.

What are the benefits?

This course will help you:

- Understand the main Excel functions used to evaluate analytical data
- Calculate the most commonly used statistical parameters
- Produce calibration plots
- Use linear and polynomial regression in calibration
- Maintain integrity of analytical data.

Contents

The course will cover:

- Designing clear data tables
- Using basic calculation functions
- Using functions and formulas to produce reliable results
- Using pivot tables
- Best practice in protecting and linking cells and spreadsheets
- Plotting charts, linear regression, polynomial regression
- Using the data analysis add-in to carry out statistical analysis of data.

Course details

Dates	Code	Price
3 November 2016	TREXC03	£300 + VAT

Evaluating measurement uncertainty for chemical testing laboratories

2 day training course

Learn the principles and practice of estimating measurement uncertainty

Measurements are always made for a reason – to answer a particular question or to help solve a problem. Whenever a measurement is made there will always be some uncertainty about the result due to unavoidable errors in the measurement process. Knowledge of the uncertainty associated with measurement results allows a judgement to be made as to whether the data are likely to be 'fit for purpose'. If comparisons of results are being made, for example when determining whether a limit has been exceeded, a meaningful interpretation of the results can only be achieved if the uncertainty is known. The evaluation of the uncertainty associated with measurement results is a requirement for testing laboratories accredited to ISO/IEC 17025. This course provides a practical approach to evaluating uncertainty in testing laboratories which is in line with the ISO principles for uncertainty estimation and current accreditation requirements. The course assumes no prior knowledge of uncertainty evaluation and includes laptop-based workshops using Excel.

Who should attend?

The course is aimed at analysts who have limited knowledge of measurement uncertainty but need to be able to evaluate the uncertainty associated with their results.

What are the benefits?

This course will help you:

- Understand how uncertainty can be evaluated for chemical test results
- Use method validation and quality control data in uncertainty estimates
- Give your customers confidence in your results
- Determine the fitness for purpose of your results
- Demonstrate compliance with regulatory limits and contract specifications
- Make valid comparisons between results obtained at different times and places
- Meet ISO/IEC 17025 accreditation requirements
- Apply statistical principles through laptop-based workshops.

Course details

Dates	Code	Price
23 – 24 February 2016	TRMU69	£850 + VAT
15 – 16 June 2016	TRMU70	£850 + VAT
12 – 13 October 2016	TRMU71	£850 + VAT

Contents

The course will cover:

Day 1 – The principles

- Introduction to the concept of measurement uncertainty
- Statistics for measurement uncertainty estimation
- The basic principles of evaluating uncertainty
- Converting data and combining uncertainties
- Cause and effect analysis
- Quantifying uncertainty components
- Approaches to uncertainty estimation.

Day 2 – The practice

- Evaluation of an uncertainty budget using spreadsheets
- Using data from validation studies
- Dealing with data from recovery estimations
- Using precision data from validation studies
- Handling uncertainty for large concentration ranges
- Using and conveying uncertainty estimates.





Method validation

3 day training course

Learn how to demonstrate that your test methods are fit for purpose

Method validation is an essential part of establishing and ensuring the quality of analytical data. It cannot be guaranteed that data will be fit for purpose unless the performance of the test method has been studied and demonstrated to be adequate. Method validation is the process that provides evidence that a test method is capable of providing data that are suitable for a particular application. It is a requirement of the ISO/IEC 17025 laboratory accreditation standard and many other sectoral regulations and directives. Method validation should always be a planned activity. This course introduces the statistics required for interpreting validation data and provides the tools to plan and carry out effective validation studies. There is ample opportunity to practice the principles learned through laptop-based workshops using Excel.

Who should attend?

This course is primarily designed for analysts and laboratory managers in the analytical chemistry sector who are involved with method development and assessing the performance of analytical methods.

What are the benefits?

This course will help you:

- Understand method validation and its requirements
- Select and apply the statistics required during method validation
- Select and use the appropriate types of method validation studies
- Appreciate and understand the link between method validation and measurement uncertainty
- Apply statistical principles through laptop-based workshops.

Course details

Dates	Code	Price
15 – 17 March 2016	TRMV59	£1290 + VAT
12 – 14 July 2016	TRMV60	£1290 + VAT
6 – 8 December 2016	TRMV61	£1290 + VAT

Contents

The course will cover:

Day 1: Essential statistics

- Introduction to statistics for method validation
- Significance testing – t-tests and the F-test
- Analysis of variance (ANOVA)
- Linear regression.

Day 2: Providing the tools

- Introduction to the concepts of method validation
- Performance parameters: precision, bias and ruggedness.

Day 3: Further tools

- Performance parameters: selectivity, capability of detection, linearity and working range
- Using validation data to estimate measurement uncertainty.

Introduction to method validation for biologists

1 day training course

Learn the key principles of validation to help ensure your experiments are fit for purpose

Biological measurements are undertaken to support a wide range of activities, from pharmaceutical development, forensic analysis and medical studies, to assessments of food safety and authenticity. Whatever the reasons for the measurements, it is essential that the data are reliable and fit for purpose. Method validation studies are essential for establishing the quality of measurement data. Validation is the formal process that provides objective evidence that methods of analysis are fit for purpose, and its importance is reflected by its inclusion in laboratory accreditation standards and other sectoral regulations and directives. This course offers an introduction to the key principles of validation for biological analysis and provides guidance on planning effective validation studies.

Who should attend?

The course is aimed at biological scientists and laboratory managers who are involved with the assessment and development of quantitative methods employing molecular biology techniques. It is suitable for those with limited or no previous experience of statistics.

What are the benefits?

This course will help you:

- Understand the general principles and importance of method validation
- Identify the relevant parameters for evaluating method performance
- Plan suitable validation studies
- Understand how to evaluate data from validation studies effectively.

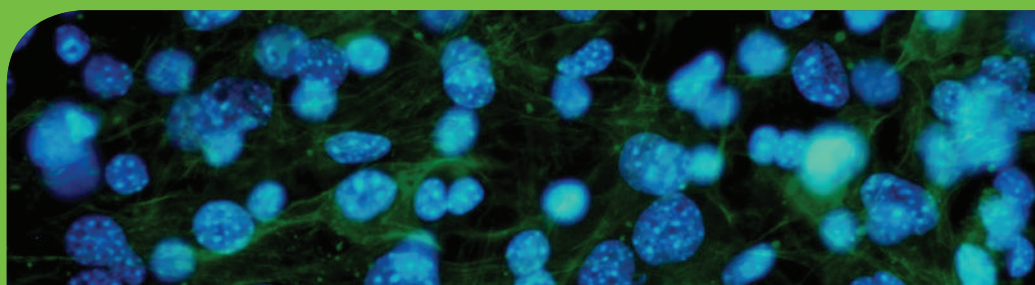
Contents

The course will cover:

- Introduction to method validation
- Selecting and evaluating the appropriate method performance parameters
- Defining the validation criteria for different parameters
- A validation case study.

Course details

Dates	Code	Price
9 June 2016	TRMVB06	£480 + VAT
8 September 2016	TRMVB07	£480 + VAT





Understanding ISO/IEC 17025 – requirements for analytical laboratories

1 day training course

Improve your awareness and understanding of ISO/IEC 17025 and its requirements

ISO/IEC 17025, 'General requirements for the competence of testing and calibration laboratories' is the current international standard for the accreditation of testing and calibration laboratories. The standard provides an internationally recognised basis for laboratories to ensure and demonstrate the quality of their results. It is essentially a list of competence criteria which the laboratory needs to meet by implementing an effective quality system. For laboratories to implement the standard effectively, staff need to have an understanding of the need for accreditation and of the main requirements of the standard. This course covers the standard and its application in detail, including the structure of quality systems, technical requirements and the role of UKAS. The course will clarify concepts and terminology and demonstrate their application through practical workshops.

Who should attend?

The course is aimed at laboratory managers, quality managers and analysts in both accredited analytical laboratories and laboratories seeking accreditation. This course will help embed within organisations the requirements for obtaining and maintaining accreditation.

What are the benefits?

This course will help you:

- Understand the benefits of a formal quality management system
- Gain a better understanding of the management requirements of the standard
- Interpret and meet the technical requirements of the standard
- Create and maintain effective quality management systems.

Contents

The course will cover:

- The ISO/IEC 17025 standard: clauses and guidance notes
- Structure of quality management systems
- Key components of the standard:
 - Management requirements
 - Technical requirements: method validation and uncertainty
 - Roles and responsibilities
- The role of UKAS.

Course details

Dates	Code	Price
10 March 2016	TRISO15	£480 + VAT
22 September 2016	TRISO16	£480 + VAT

Using proficiency testing in the analytical laboratory

1 day training course

Learn how to get the maximum benefit from participation in proficiency testing schemes

Proficiency testing (PT) is the only way laboratories can obtain an independent assessment of their performance. Participation in a scheme gives laboratories an objective measure of the quality of their output and is therefore a highly effective diagnostic tool for a laboratory's quality system. There is more to be gained from PT results than a simple assessment of 'satisfactory' or 'unsatisfactory' performance. This course focuses on the interpretation of PT performance scores and the types of investigations and corrective actions that may be required in the event of an unsatisfactory score. The course also covers the statistics commonly used in PT schemes which will aid with the interpretation of PT data.

Who should attend?

This course is designed for laboratory staff (chemists and microbiologists) who participate in PT schemes and/or are responsible for the interpretation of PT results. The course is also suitable for laboratory customers and auditors who use PT scheme performance as a tool for monitoring a laboratory's quality.

What are the benefits?

This course will help you:

- Understand how PT works and the different types of schemes that are available
- Interpret and use effectively the results and evaluation from PT schemes
- Understand the statistical approaches used in proficiency testing.

Contents

The course will cover:

- An introduction to PT, how it works and its objectives
- Statistics used in PT schemes
- Interpretation of PT scheme data
- Feedback on laboratory performance and corrective actions.

Course details

This course will be delivered on a demand basis only. Please contact us to register your interest in this course or to discuss on-site training.





Laboratory management – role of the quality manager and technical management 3 day training course

UKAS provides this course

All laboratories need to have sound business processes to enable them to deliver technically sound calibrations and tests to their clients. When a laboratory is seeking to have its competence recognised through accreditation by UKAS, these processes must also enable the laboratory to meet the requirements of ISO/IEC 17025:2005.

Who should attend?

This course is aimed at personnel from accredited or applicant laboratories who have responsibility for the technical or quality management of the tests or calibrations performed.

What are the benefits?

This course will help you:

- Understand how the business processes of your laboratory can be combined effectively with the requirements of ISO/IEC 17025
- Understand the roles of quality manager and technical management.

Contents

The course will cover:

Day 1

- Laboratory structure
- Organisation charts
- Quality management system framework and role of ISO/IEC 17025

- Job descriptions
- Laboratory facilities, services and supplies
- Equipment and personnel
- Training and competency records.

Day 2

- Review of customer requests
- Subcontracting
- Test and calibration methods
- Method validation
- Documentation and document control process
- Customer samples and items.

Day 3

- Calibration and test performance
- Work sheets
- Management controls
- Audit programme
- Non-conforming work
- Records
- Opinions and interpretations
- Complaints
- UKAS assessment.

Course details

* Includes all meals and accommodation for two nights.

Dates	Code	Price (residential)*
19 – 21 January 2016	TRLM40	£1400 +VAT
19 – 21 April 2016	TRLM41	£1470 +VAT
25 – 27 October 2016	TRLM42	£1470 +VAT



Laboratory internal audit

2 day training course

UKAS provides this course

All laboratories need to carry out an internal audit of their business processes and performance of tests and calibrations to ensure delivery of a competent service to their clients. An accredited laboratory needs to check not only that laboratory personnel at all levels are implementing the prescribed processes but also that its systems and practices are compatible with the requirements of ISO/IEC 17025:2005.

Who should attend?

The course is suitable for anyone involved with or interested in the use of internal audits, new quality managers and new laboratory staff.

What are the benefits?

This course will help you:

- Understand the internal audit process and its value
- Gain confidence in performing internal audits.

Contents

The course will cover:

Day 1

- Internal laboratory audits
- Content of an audit programme
- Witnessing activities

- Audit records and checklists
- Corrective and preventive actions
- Audit forms
- Human aspects of auditing
- Practical audit of a test
- Writing observations and non-conformances.

Day 2

- Reporting findings to auditees
- Preparing an audit report for management
- Assignment of corrective actions
- Management review.

Course details

* Includes all meals and accommodation for one night.

Dates	Code	Price (residential)*
15 – 16 March 2016	TRLIA46	£1100 + VAT
5 – 6 July 2016	TRLIA47	£1150 + VAT
28 – 29 September 2016	TRLIA48	£1150 + VAT
1 – 2 December 2016	TRLIA49	£1150 + VAT



Registration details

How to register

Book online at: www.lgcgroup.com/training
Fax the registration form to: **+44 (0)20 8943 2767**
Call **Bernadette Francis: +44 (0)20 8943 7631**
Email: training@lgcgroup.com

Post the registration form to:

Bernadette Francis
LGC Training Centre
Queens Road
Teddington, Middlesex
TW11 0LY, UK

The course fee includes a delegate pack, lunch and refreshments.
A list of local accommodation will be supplied.

Payment and discounts

- All fees must be paid in advance of the course
- VAT is payable on all training course fees
- Payments can be made by cheque, credit card and BACS
- To be invoiced for the course fees, please supply a purchase order number with your booking
- Provisional bookings can only be held for ten working days
- There are discounts available for group bookings (see page 9).

Cancellations and substitutions

- A full refund will be provided for cancellations received more than 30 working days before the commencement of the training course
- A refund of 50% will be provided for cancellations received between 15 and 30 working days before the commencement of the training course
- No refunds will be given for cancellations received fewer than 15 working days before the commencement of the training course
- Substitutions will be accepted at any time at no additional charge.

Transfers

Registered delegates who wish to transfer to a different date for the same course (subject to availability) can do so for the following charges:

- No charge for transfer notification received more than 30 working days before the commencement of the training course
- A charge of £50 + VAT for transfer notification received between 15 and 30 working days before the commencement of the training course
- A charge of £100 + VAT for transfer notification received fewer than 15 working days before the commencement of the training course.

LGC reserves the right to cancel or amend its training courses. Registered delegates will be informed and, where applicable, their training course fee refunded.

Registration form

Please return by post or fax to:

Bernadette Francis, LGC, Queens Road, Teddington, Middlesex TW11 0LY, UK

Tel: +44 (0)20 8943 7631, Fax: +44 (0)20 8943 2767

Register online at: www.lgcgroup.com/training

Delegate details (block capitals please):

Name: (as required on delegate badge)			
Company:			
Address:			
	Postcode:		
Telephone:	Fax:		
Email:			

Course details (block capitals please):

Course title:			
Course code:	Course date:		
Course price:	Total (incl. VAT) £:		

Payment details (Please tick to indicate payment type):

Invoice: <input type="checkbox"/>	Purchase Order no. <input type="text"/>	
Cheque: <input type="checkbox"/> (payable to LGC Limited)	BACS: <input type="checkbox"/> (please contact Bernadette Francis for bank details)	Credit/debit card: <input type="checkbox"/> (Not Amex/Diners)

Card type (e.g. Visa, Mastercard):	Expiry date:	
Card number:		
Name on card:		
Issue no. (Switch/Maestro only):	3 digit security code:	
Billing address (if different to above):		

By completing and returning this form to us, you agree to your personal information being processed by members of the LGC Group for the administration and provision of our products and services. **Please tick this box to indicate that you wish to receive information about future LGC training courses and related products and services. You can change your marketing preferences at any time by emailing training@lgcgroup.com.**





LGC, Queens Road, Teddington, Middlesex TW11 0LY, UK

www.lgcgroup.com

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