HSA-SAC Joint Training Courses 2019

Basic Statistical Tools
5 Apr 2019 (9.00 AM – 5.00 PM)
Course fees per pax : $267.50 (inclusive of GST)

Method Validation for Chemical Testing
7 May 2019 (9.00 AM – 5.00 PM)
Course fees per pax : $267.50 (inclusive of GST)

Measurement Uncertainty for Chemical Testing
29 Jul 2019 (9.00 AM – 5.00 PM) &
30 Jul 2019 (9.00 AM – 1.00 PM)
Course fees per pax : $406.60 (inclusive of GST)

Measurement Uncertainty for Chemical Testing (with emphasis on water testing parameters)
26 Aug 2019 (9.00 AM – 5.00 PM) &
27 Aug 2019 (9.00 AM – 1.00 PM)
Course fees per pax : $406.60 (inclusive of GST)

Venue:
Recreation Room, Level 1
Health Sciences Authority
11 Outram Road
Singapore 169078
(Opposite Outram MRT)

Register at **https://bit.ly/2GygoWl**
or scan to register:

Jointly organised by:

HSA Health Sciences Authority
SINGAPORE ACCREDITATION COUNCIL

Module 1: Basic Statistical Tools

Objectives
This module is designed to give a comprehensive introduction to fundamental concepts in statistics and basic tools used for data analysis in chemical and environmental testing. It provides the foundation for the modules on method validation and measurement uncertainty in chemical testing.

Syllabus
- Descriptive statistics
- Probability distribution
- Outlier's test
- Significance testing – *F*-test and Student's *t*-test
- One-way analysis of variance (ANOVA)
- Linear regression
- Worked examples and exercises

Who Should Attend
Technical staff of laboratories, managers and others who are interested in understanding or need a refresher on basic statistical tools used for data analysis in chemical and environmental testing. This module is a pre-requisite for participants who wish to attend Modules 2 and 3 but have previously not attended any of these training courses.

Module 2: Method Validation for Chemical Testing

Objectives
This module enables the participants to know the parameters studied in a method validation, to select and apply the required statistical tools and to link the topic to estimation of measurement uncertainty. Worked exercises and practice questions in the form of spreadsheets will be provided to reinforce concepts and to enable the participants to apply what they have learnt to their work.

Syllabus
- Fundamental principles of analytical method validation
- Building a validation protocol
- Performance parameters:
  - Selectivity/specificity
  - Precision
  - Bias
  - Linearity and working range
  - Limit of detection
  - Limit of quantification
  - Robustness
  - Ruggedness
- Using validation data to estimate measurement uncertainty
- Documentation and report
- Worked examples and exercises

Who Should Attend
Technical staff of laboratories, managers and others, who are interested to learn how method validation is carried out and data are analysed, or needs to perform method validation in their laboratories.

Module 3a: Measurement Uncertainty for Chemical Testing

Objectives

This module enables the participants to understand the methods of both the "top-down" and "bottom-up" approaches to estimating measurement uncertainty. Worked exercises and practice questions in the form of spreadsheets will be provided to reinforce concepts and to enable the participants to apply what they have learnt to their work.

Syllabus

- Measurement uncertainty and reasons for estimating measurement uncertainty
- Measurement errors and propagation of random errors
- Bottom-up approach to estimating uncertainty using ISO GUM measurement uncertainty principles
  - Specification of measurand
  - Identify sources of uncertainty
  - Quantify the components of uncertainty
  - Convert uncertainty data into standard uncertainties
  - Estimate combined uncertainty and expanded uncertainty
- Top-down approach to estimating uncertainty
  - Specification of measurand
  - Identify sources of uncertainty
  - Quantify precision
  - Quantify bias
  - Estimate combined uncertainty and expanded uncertainty
- Report results and uncertainty
- Estimating uncertainty from sampling (New requirement in ISO/IEC 17025:2017)
- Worked examples and exercises

Who Should Attend

Technical staff of laboratories, managers and others, who want to gain knowledge, improve their understanding, or be able to apply the appropriate statistical tools in their estimation of measurement uncertainty.

Module 3b: Measurement Uncertainty for Chemical Testing (with emphasis on water testing parameters)

Objectives

This module enables the participants to understand the methods of both the "top-down" and "bottom-up" approaches to estimating measurement uncertainty. Worked exercises and practice questions in the form of spreadsheets will be provided to reinforce concepts and to enable the participants to apply what they have learnt to their work.

Syllabus

- Measurement uncertainty and reasons for estimating measurement uncertainty
- Measurement errors and propagation of random errors
- Bottom-up approach to estimating uncertainty using ISO GUM measurement uncertainty principles
  - Specification of measurand
  - Identify sources of uncertainty
  - Quantify the components of uncertainty
  - Convert uncertainty data into standard uncertainties
  - Estimate combined uncertainty and expanded uncertainty
- Top-down approach to estimating uncertainty
  - Specification of measurand
  - Identify sources of uncertainty
  - Quantify precision
  - Quantify bias
  - Estimate combined uncertainty and expanded uncertainty
- Report results and uncertainty
- Estimating uncertainty from sampling (New requirement in ISO/IEC 17025:2017)
- Worked examples and exercises (with emphasis on water testing parameters)

Who Should Attend

Technical staff of laboratories, managers and others working in water testing laboratories, who want to gain knowledge, improve their understanding, or be able to apply the appropriate statistical tools in their estimation of measurement uncertainty.

About the Trainers

Ms Cheow Pui Sze

Ms Cheow obtained her MSc (Chemistry) degree from NUS in 2008. She is a Senior Scientist and Team Leader of the Organic Chemistry Section. Ms Cheow has over 8 years' experience in providing statistical training to scientists in local and overseas laboratories. Ms Cheow also served as a member of a working group tasked to develop the SAC Technical Guide 4 – A Guide on Measurement Uncertainty in Medical Testing. She is involved in the method validation and estimation of measurement uncertainty in international and regional comparative studies participated by the Laboratory, and is also largely responsible for the implementation of statistical methods in the proficiency testing programmes organised by the Laboratory.

Dr Benny Tong

Dr Tong received his PhD degree from NTU in 2014. He joined the Chemical Metrology Laboratory in HSA since 2015 as a Scientist with the Inorganic Chemistry Section and Statistical Support Unit. Since then, Dr Tong has been involved in new method development and validation for the Laboratory, in which the methodologies are used for providing proficiency testing programmes and external quality assurance programmes to commercial testing laboratories. In the past years, he has been providing statistical training to local and overseas laboratories, and in organising/participating in international and regional comparative studies participated by the Laboratory.

For further information, please email us at HSA_CML@hsa.gov.sg, or call 6775 1605 ext 125