HSA-SAC Joint Statistics Training Courses

Eligible for use of SkillsFuture credits

Basic Statistical Tools
4 Jul 2023 (9.00 AM – 5.00 PM)
Course fees per pax: $250 (subjected to prevailing GST)

Method Validation for Chemical Testing
25 Jul 2023 (9.00 AM – 5.00 PM)
Course fees per pax: $250 (subjected to prevailing GST)

Measurement Uncertainty for Chemical Testing
22 Aug 2023 (9.00 AM – 5.00 PM) &
23 Aug 2023 (9.00 AM – 1.00 PM)
Course fees per pax: $380 (subjected to prevailing GST)

Venue:
Recreation Room, Level 1, Health Sciences Authority
11 Outram Road, Singapore 169078
(2 minutes walk from Outram MRT station)

Please register at
http://go.gov.sg/hsa-sac-courses
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 – Dixon's Q test and Grubbs' 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 evaluation 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 evaluate measurement uncertainty
- Verification of standard methods
- 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 3: 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 evaluating 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 evaluating measurement uncertainty
- Measurement errors and propagation of random errors
- Bottom-up approach to evaluating 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
  - Evaluate combined uncertainty and expanded uncertainty
- Top-down approach to evaluating uncertainty
  - Specification of measurand
  - Identify sources of uncertainty
  - Quantify precision
  - Quantify bias
  - Evaluate combined uncertainty and expanded uncertainty
- Report results and uncertainty
- Decision rule and evaluating uncertainty from sampling (New requirements 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 evaluation of measurement uncertainty.

Since 2014, HSA has been partnering SAC to jointly organise statistics courses. The main objective of the training courses is to elevate the knowledge of basic statistical tools, method validation and measurement uncertainty among the testing laboratories. Till date, we have co-organised about 22 sessions of statistics courses for close to 500 attendees. Most of the trainees who attended the courses were from Singapore, while some were from countries such as Brunei, Cambodia, Indonesia, Malaysia and Maldives.

About the Trainers

Ms Cheow Pui Sze

Ms Cheow obtained her MSc (Chemistry) degree from the National University of Singapore in 2008. She is a Consultant Scientist and Team Leader of the Organic Chemistry Section in the Chemical Metrology Laboratory (CML), Health Sciences Authority (HSA). She also heads the Statistics Unit in HSA CML. Ms Cheow has over 10 years' experience in providing statistical training to scientists and technical officers in HSA, as well as local and overseas laboratories. She has also provided a number of consultancy services on statistics to testing laboratories. Ms Cheow serves as SAC-SINGLAS Technical Assessor and was also a member of a working group tasked to develop the SAC Technical Guide 4 – A Guide on Measurement Uncertainty in Medical Testing. She also contributed to the latest revision of the SAC Technical Guide 2 - A Guide on Measurement Uncertainty in Chemical & Microbiological Analysis. Ms Cheow is involved in the method validation and evaluation of measurement uncertainty in international and regional comparative studies participated by HSA CML and is also largely responsible for the implementation of statistical methods in proficiency testing programmes organised and certified reference materials produced by the laboratory. Ms Cheow's experience covers GC-MS, GC-FID/ECD, HPLC-DAD, HPLC-CAD, HPLC-MS, GC-MS/MS, ion chromatography, Karl Fischer coulometry, thermogravimetry and isotope dilution mass spectrometry.

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

Dr Benny Tong Meng Kiat

Dr Tong received his PhD degree from the Nanyang Technological University in 2014. He is a Senior Scientist in HSA CML. He first joined the Inorganic Chemistry Section in 2015 and later joined the Organic Chemistry Section in 2019. He is also a SAC-SINGLAS Technical Assessor. Dr Tong has been involved in new method development and validation for the HSA CML, in which the methodologies were used in proficiency testing programmes and external quality assessment programmes organised for testing laboratories. Dr Tong has over 5 years' experience in providing statistical training to analysts in local and overseas laboratories. In the past years, he has been actively involved in performing method validation and evaluation of measurement uncertainty, organising/participating in international and regional comparative studies participated by the Laboratory. Dr Tong's experience covers isotope dilution mass spectrometry and standard additions techniques. He is experienced in various instrumentation such as ICP-MS, GC/LC-MS, TGA and NMR. Dr Tong is also interested in data analytics.

Dr Ng Sin Yee

Dr Ng obtained her PhD (Chemistry) degree from the National University of Singapore in 2006. She is a member of the Inorganic Chemistry Section in the Chemical Metrology Laboratory, HSA. She has been actively involved in the development and validation of new measurement capabilities in the field of inorganic metrology. These include the measurement of a broad range of elements, species, and anions in a variety of matrices such as food, water, pharmaceutical and biological samples. She has also been involved in the production of certified reference materials, proficiency testing programme and external quality assurance programme, evaluation of measurement uncertainty, and participation in international and regional comparative studies.