
by Dennis LEE Wah Kwan
Honorary Professor
Testing and Certification, School of Science & Technology
The Open University of Hong Kong

Date: 2020-08-24 to -26

Organized by

Hong Kong Association for Testing, Inspection and Certification Ltd.

This course 1) explains the basic statistics & the concept of measurement uncertainty (MU) and 2) provides training for the estimation of MU in laboratories in accordance to GUM.
Objective

This three-day course is designed and delivered by a HKAS Technical Assessor who was the Chief Engineer & Head of Hong Kong Standards & Calibration Laboratory, HKSARG for laboratory personnel who are interested in the concept of measurement uncertainty (MU), how it affects all laboratory results and possible compliance decisions. As such the course is particularly suitable for senior laboratory staff, supervisors, approved signatories and laboratory managers.

During the course, worked examples such as:

- Mechanical Measurement: Calibration of End-Gauge
- Electrical Measurement: Calibration of Standard Artefacts (with output quantities); Standard Instruments (with indicated readings) and Instruments for Scientific / Engineering Applications

are given out to illustrate the basic principles for evaluating and expressing uncertainty in measurement. They should enable participants to put these principles into practice in their own work, in particular on the following areas:

- The measurement problem
- Mathematical model
- Contributory variances (including second-order terms)
- Combined standard uncertainty
- Expanded uncertainty
- Reporting measurement uncertainty

The basic statistics frequently encountered in the estimation of MU will also be covered to facilitate the comprehension of the estimation by participants with different mathematics background.

Outline

1. What is measurement?
   - Definition of measurement
   - Quantities and units
   - System of quantities (including the International System of Units, SI)
   - Dimensions of quantities; coherent units and derived units; SI prefixes
   - Measurement traceability; measurement infrastructure
   - Measurement legislation

2. What is measurement uncertainty?
   - Definition of measurement uncertainty
   - Basic concepts on uncertainties in measurement
   - Basic statistical concepts for measurement

3. General guidelines to uncertainty of measurement
   - Fundamentals on measurement uncertainty
   - Evaluating measurement uncertainties
   - Worked examples – calculation of measurement uncertainties
   - Possible ways to reduce uncertainty in measurement
   - Good practices in uncertainty estimation
   - Further considerations
     o Putting the knowledge into practice
     o Estimating uncertainty for practitioners seeking laboratory accreditation for calibration or testing
**Date and Time**

2020-08-24 to 26

9:30am to 5:00pm

Registration deadline: **2020-08-17**

**Venue**

Near Chai Wan MTR station

To be announced 1 week before the training via email

**Instructor**

Mr. Dennis LEE Wah Kwan

OUHK Honorary Professor
HKAS Technical Assessor
Ex-Chief Engineer & Head of Hong Kong Standards & Calibration Laboratory, HKSARG

**Language**

Chinese with English slides

**No. of Participants**

Maximum 21 people

**Fee**

HK$ 4,000 for HKTIC members
HK$ 4,400 for others

Including course notes and refreshments

Fee will be refunded for unsuccessful registration and course cancellation.

**Assessment and Awards**

There will be a written examination at the end of the training.

A ‘Certificate of Achievement’ will be awarded to those who have satisfactory attendance and pass the examination.

A ‘Certificate of Attendance’ will be awarded to those who have satisfactory attendance only.

**Registration**

1. Email the completed registration form to

   training.qmshk@gmail.com

2. Prepare a signed crossed cheque payable to

   "Hong Kong Association for Testing, Inspection and Certification Ltd."

3. Before the deadline, post the completed registration form and signed crossed cheque to

   HKTIC Secretariat
   1/F., CMA Building,
   64-66 Connaught Road Central,
   Hong Kong.

**Enquiry and Advance Seat Reservation**

Email: training.qmshk@gmail.com
Tel.: +852 6306 1959
HKTIC Organized

Guide to Expression of Uncertainty in Measurement

Registration Form

Participants: Suitable for laboratory manager, senior laboratory staff, supervisor and (HKAS) approved signatory

Course Content: Please refer to the detail course outline

Date and Time: 2020-08-24 to 2020-08-26, 9:30am – 5:00pm

Venue: Near Chai Wan MTR station; to be announced 1 week before the training via email

Participant: Dr. / Ir. / Mr. / Mrs. / Ms. / Miss ___________________________
Name to be shown on the certificate Full name in block letters, surname first

Organization: ______________________________________________________

Position / Job Title: _________________________________________________

Mobile No. / Phone: Participant Admin., HR, etc., if applicable

Email: Participant Admin., HR, etc., if applicable

Fee (HK$): Please tick one HKTIC member $4,000 □ Others $4,400 □

Payment:

Cheque No. Bank Amount

Receipt Recipient: Please tick one Organization □ Participant □

Mailing address: ___________________________________________________

Address to be used for receiving the certificate and receipt

For registration, please

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3) post the completed registration form and signed crossed cheque on or before 2020-08-17 to HKTIC Secretariat, 1/F., CMA Building, 64-66 Connaught Road Central, Hong Kong.

For enquiry and advance seat reservation, please write to or call

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