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## Introduction

The Measurement of Uncertainty in the microbiological laboratory is increasingly a requirement of industry accreditations internationally, in particular for laboratories accredited to the ISO/IEC 17025 standard (or equivalents like ISO/IEC16159).

The estimation of uncertainty of measurement provides a quantitative estimate of the quality of a measurement value, and is thus an essential component of a quality management system for laboratories.

This course is designed to help laboratories engaged in routine microbiological analysis to calculate uncertainties of their test or measurement results. The workshops take participants through the process of evaluating uncertainty in microbiology with hands-on formulae (APLAC method) being provided as well as an appreciation of a European method which follows closely the generic GUM.

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## Objectives

1. Understand the factors contributing to the overall uncertainties
2. Identify the accreditation body requirements for determining expanded uncertainty of measurements
3. Enable analysts/microbiologist to carry out an uncertainty evaluation for their own laboratory methods

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## Who Should Attend

Practitioners in chemical and microbiological laboratories, microbiologists, food technologists, and others involve in the food and microbiological testing.

*(Participants preferably should have some knowledge of or attended the uncertainty of measurement course on metrology or chemical testing before)*

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## Course Contents

### Day 1

- Introduction & Definitions
- Interpretation & Guidance
- Principles of estimating the uncertainties
  - Standard uncertainty
  - Calculating the combined uncertainty
  - Expanded uncertainty
- Experimental Protocol
- Interpretation for microbiological testing
- Poisson/Bias
- Uncertainty arise from sampling

### Day 2

- Estimation uncertainty step-by-step
  - Simplest approach
  - Alternative data
- Fish Bone Diagram
- Estimation of the components of uncertainty
- Mathematical models of microbiological test results and uncertainties
- Cochran's test
- Reporting measurement uncertainty
- Measurement uncertainty for low count

Workshops on Examples using various methods including method recommended for APLAC countries. Some hands-on formulae would also be provided.

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## Course Presenter

**STEPHEN WONG** – is a Certified Trainer by the Human Resource Department (HRD) of the Ministry of Human Resource, Malaysia. He is an excellent Quality Consultant, trainer and qualified Lead Assessor for both ISO 9000 and ISO/IEC 17025. He is also an effective management trainer. He holds a MBA degree (University of Wales, UK), Chemistry degree (University Malaya), Diploma in Marketing (CIM, UK) and Certified Diploma in Accounting & Finance (ACCA, UK). He has 34 years of management & training experience, including 24 years in quality training and consultancy.

He was the Hon. Secretary (16 years) for the Institute of Quality Malaysia, an approved Quality Trainer for SIRIM since 1989 and a Quality and Management Consultant to some companies in Malaysia. He is a Council Member (since 1989) of the Malaysian Institute of Management and is also a well recognized trainer for MIM. He is also the Gen. Secretary of Malaysia Register of Certificated Auditors (MRCA) since its inception in 1998.

He was a member (1991-2002) of the Malaysian National Accreditation Council of the Department of Standards Malaysia and still sits on three other national committees on Quality and Environmental in relation to ISO. Mr. Stephen Wong has been a key member of the TC 176 and TC 207 national committees responsible to CASCO for the development of the ISO 9001, ISO/IEC 17025 and ISO 14001 standards and other conformity assessment standards. He is also a member of the IATCA (now IPC) representing MRCA in the development of the ISO 19011 Auditing Standard for the ISO 9000 and the ISO 14000.

## Registration Form

Please register the following for the course on  
"Uncertainty of Measurement in Microbiology"

Name: \_\_\_\_\_

Designation: \_\_\_\_\_

Name: \_\_\_\_\_

Designation: \_\_\_\_\_

*(please attached extra list if more than two participants)*

**Reminder: Participants need to bring a laptop and scientific calculator for this course.**

Name & Address of Company:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Contact Person: \_\_\_\_\_

Designation: \_\_\_\_\_

Tel: No: \_\_\_\_\_ Fax: \_\_\_\_\_

E-mail: \_\_\_\_\_

I/We enclosed a cheque no: \_\_\_\_\_ amount to  
RM \_\_\_\_\_ made payable to WKS HOLDINGS  
SDN BHD.

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

WKS reserves the right to cancel or postpone the course in  
the event of unforeseen circumstances.

## Registration Guidelines & Procedures

1. Early registration is encouraged. Participants shall be registered on a first-come-first-served basis.
2. Register by completing attached form and return by fax or e-mail.
3. Payment by crossed cheque / postal order made payable to WKS HOLDINGS SDN BHD together with registration form, to be received at least 4 days before the course commences.
4. Notification of cancellation must be in writing received 4 working days prior to commencement of course (20% of course fee will be retained). Otherwise, full fee will still be charged.
5. A registration fee is inclusive of course materials, refreshments and lunch.
6. Closing date is 4 days before commencement of the course.

**WKS HOLDINGS SDN BHD** (129630-A)  
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Http://www.wks-h.com



# Uncertainty of Measurement *in* Microbiology



## Administrative Details

Date: 18 – 19 May 2017  
Time: 0900 – 1715  
Venue: Plaza Mayang, PJ  
Fees: RM 980 per participant  
HRDF Claimable

Organized & Management by

**WKS HOLDINGS SDN BHD**

