



(1093652-W)  
**Ascendent Technology Sdn. Bhd.**  
*(Rated as 5 Star Training Provider by PSMB)*



Claimable



SBL Claimable

## Measurement Uncertainty



- The word “uncertainty” means doubt, and thus “uncertainty of measurement” means doubt about the validity of the result of a measurement.

# MEASUREMENT UNCERTAINTY ESTIMATION (Competency Training)

### PROGRAMME OVERVIEW:

Measurement uncertainty describes a region about an observed value of a physical quantity which is likely to enclose the true value of that quantity. Reporting measurement uncertainty is compulsory for MS ISO/IEC 17025 accredited calibration and mechanical testing laboratories. This training module is designed based on ISO Guide to the Expression of Uncertainty in Measurement, 1995 and Eurachem / CITAC Guide CG 4, Quantifying Uncertainty in Analytical Measurement, 2<sup>nd</sup> Edition, which are the current version that these laboratories are supposed to follow. Participants are guided through a series of hands on practice, conduct experiments,

collect data and perform calculation, learning from the simplest example of expressing uncertainty to complex multiple unit models. Examples in these fields are discussed so that participants can apply the knowledge in daily working environment, to design and modify uncertainty models. On top of these, the module does emphasis on its application which is beyond the content of the Guide. The course is practical, easy understanding and applicable to all types of testing in general.

### TARGET GROUP:

Quality Managers, Technical Managers, Laboratory Managers, Supervisors, Chemist, Microbiologist, Engineer, Signatories of test reports & certificates, Laboratory Personnel.

**CONTENT:****SUBJECTS OF STUDY**

- 1) Introduction
- 2) Scope
- 3) Uncertainty relates to the use of instrument in the context of ISO Quality Management System
- 4) The concept
- 5) Make a model of the measuring system
- 6) Identify all sources of uncertainty
- 7) Calculate the standard uncertainty  $u$  for each parameter
- 8) Calculate the combined standard uncertainty  $U_c$
- 9) Calculate the degree of freedom
- 10) Calculate the expanded uncertainty
- 11) Reporting uncertainty

**PRACTICAL ACTIVITIES****Model 1:**

- 1) Simple linear dimension measurement & estimation of uncertainty
- 2) Use Ishikawa chart to identify sources of uncertainty and build model equation
- 3) Convert sources of uncertainties to standard uncertainty
- 4) Combine standard uncertainties using equation No. 10 of the Guide
- 5) Determine effective degree of freedom using Welch Satterthwaite formula and value of  $K$ , convert factor using student t-table
- 6) Expand the combine standard uncertainty with  $K$
- 7) This model enables the participant to understand the concept of measurement uncertainty evaluation

**Model 2**

Calibration of Balance and estimate its uncertainty for calibration laboratory participants.

**Model 3**

Two dimensions, single measurement unit e.g. calculate area, coefficient of sensitivity & estimate its uncertainty

**Model 4**

Three dimensions, single measurement unit e.g. calculate volume, coefficient of sensitivity & estimate its uncertainty

**Model 5:**

Multiple dimensions and measurement units & estimate uncertainty e.g. calculate the density of a piece of metal & estimate uncertainty

Trainer shall discuss models related to customer work place upon request.

**METHODOLOGY :**

- 1) Building life models calculations
- 2) Case studies
- 3) Brain storming
- 4) Hands on practice
- 5) Lecture
- 6) Discussion
- 7) Course project

**LEARNING OUTCOME :**

At the end of the course, participants are expected to:

- ✓ Understand the concept of measurement uncertainty and its application
- ✓ Apply the knowledge of measurement uncertainty in mechanical, physical testing and calibration laboratories to meet the requirements of all ISO quality management systems.

**CERTIFICATE :**

Participants are required to complete a project usually at the end of training or within 2 weeks of completion of the training

- ✓ Certificate of Competency - achieved score points 70% and above
- ✓ Certificate of Attendance - achieved score points below than 70% or no submission of project

**REMARK:**

1. Candidates need to bring along their scientific calculator for assessment
2. Candidate is required to complete the assessment during training or must submit the completed assessment within 2 weeks after the training is completed.
3. Certificate will be issue based on score point in the assessment.
4. The original assessment paper will be return to customer together with certificate.
5. Candidate with poor score is advisable to re-seat the training and assessment.

## REGISTRATION FORM (L004):

### PUBLIC TRAINING

**Course Fee** : RM1,900 per participant  
**Training Date** : Refer to 2020 Training Calendar  
**Duration** : 2 days  
**Time** : 9.00am – 5.00pm  
**Venue** : Ascendent Technology Sdn. Bhd.  
**HRDF** : SBL Full Payment

### IN-HOUSE TRAINING

**Course Fee** : RM5,000 per man day  
**Training Date** : To be determine by customer  
**Duration** : 2 days  
**Time** : 9.00am – 5.00pm  
**Venue** : Customer's premises / Hotel  
**HRDF** : SBL Full Payment

### CANCELLATION / POSTPONEMENT POLICY

1. Ascendent Technology Sdn.Bhd. reserves the right to cancel, postpone or make any changes to the venue and training dates due to unavoidable circumstances.
2. Reservation can be made by telephone or email, but will only be confirmed upon the received of completed registration form and payment.
3. Please do not make any travel arrangements until you have received written confirmation for your registration from us.
4. No cancellation is allowed but a candidate replacement can be arranged.
5. For confirm cancellation: 7 days notice prior to commencement will subjected to RM250 service charge. If less than 7 days notice, there will be no refund.
6. Confirm postponement for in-house training less than 14 days notice prior to commencement will subjected to 50% service charge on total invoice.

Participant's Name : Mr / Ms. ....  
 Designation : .....  
 Department : .....  
 Email : .....

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### PAYMENT DETAILS

All cheques should be crossed and made payable to: **ASCENDENT TECHNOLOGY SDN BHD** Bank A/C No. **Public Bank Berhad** 3190-2958-32 / **Maybank** 5127-6360-6820.

Admittance will be permitted upon receipt of full payment 2 weeks before the course is conducted.

Training certificate will be awarded upon received of full payment

### FOR HR DEPARTMENT

Company Name:		Contact Person: Mr / Ms:	
Address:		Designation:	
		Department:	
		Email:	
		Mobile No :	
Telephone:		Signature:	Company Stamp:
Fax:			
Type of Industry:			