MTBM

MEASUREMENT UNCERTAINTY FOR CALIBRATION & TESTING LABORATORY TRAINING

REGISTERED HRD CORP TRAINING PROVIDER

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MTBM Group Sdn. Bhd. (1600656-M)

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Course Title: Measurement Uncertainty for Calibration & Testing Laboratory Training

Course Validity: 2 Days

Validity: Not Applicable

HRD Corp Scheme: Claimable

INTRODUCTION

This training provides comprehensive knowledge and practical skills for estimating Measurement Uncertainty (MU) in accordance with ISO/IEC 17025:2017, GUM (Guide to the Expression of Uncertainty in Measurement), and ILAC requirements. Participants will learn the concepts, step-by-step MU estimation process, probability distributions, sensitivity coefficients, uncertainty budget creation, and validation of MU for both calibration and testing laboratories. The program emphasises hands-on exercises using real laboratory data to enable participants to calculate MU confidently and apply it effectively in routine laboratory operations.

OBJECTIVE(S):

- Understand the principles of Measurement Uncertainty based on GUM and ISO/IEC 17025.
- Learn how to identify, classify, and quantify uncertainty contributors.
- Develop competence to calculate standard uncertainty, combined uncertainty, and expanded uncertainty.
- Create uncertainty budgets for testing and calibration methods.
- Understand traceability, repeatability, reproducibility, and their relationship to uncertainty.
- Apply MU in laboratory decision rules and conformity assessment.

TARGET GROUP(S):

- Laboratory Managers & Supervisors
- Calibration/Testing Analysts & Technicians
- Quality Managers & QA Personnel
- Internal Auditors & Technical Assessors
- Anyone involved in MU estimation, reporting, or decision rules

ENTRY REQUIREMENT(S):

- Able to read, write, and communicate in Malay/English
- Basic understanding of testing or calibration principles

TOPIC(S):

1. Fundamentals of Measurement Uncertainty
2. ISO/IEC 17025:2017 Requirements for MU
3. GUM Framework & Principles
4. Identifying and Classifying Uncertainty Components
5. Type A & Type B Evaluations
6. Standard, Combined & Expanded Uncertainty
7. Sensitivity Coefficients & Mathematical Models
8. Developing an Uncertainty Budget
9. MU for Testing Laboratories
10. MU for Calibration Laboratories
11. Decision Rules & Conformity Statements
12. Practical MU Calculation Workshop

LIST OF REFERENCE BOOK(S):

- ISO/IEC 17025:2017 Standard
- JCGM 100:2008 (GUM)
- ILAC P14, ILAC G17, EURAMET Guidelines

LIST OF TEACHING AID(S):

- LCD projector
- Computer
- Whiteboard with accessories

METHODOLOGY(S):

- Lecture
- Group activities
- Case studies
- Practical MU calculation exercises

TRAINING SCHEDULE

Day 1

Time	Activity / Topic
8:30 am – 9:00 am	Registration and Introduction
9:00 am – 9:45 am	Topic 1: Fundamentals of Measurement Uncertainty
9:45 am – 10:30 am	Topic 2: ISO/IEC 17025 Requirements Related to MU
10:30 am – 10:45 am	**Morning Tea Break**
10:45 am – 11:30 am	Topic 3: GUM Framework and Key MU Concepts
11:30 am – 12:30 pm	Topic 4: Identifying Uncertainty Components
12:30 pm – 1:30 pm	**Lunch Break**
1:30 pm – 2:30 pm	Topic 5: Type A and Type B Evaluations
2:30 pm – 3:30 pm	Topic 6: Standard Uncertainty & Probability Distributions
3:30 pm – 3:45 pm	**Afternoon Tea Break**
3:45 pm – 5:00 pm	Exercise 1: Working with Laboratory Data (Type A/Type B)

TRAINING SCHEDULE

Day 2

Time	Activity / Topic
8:30 am – 9:00 am	Recap of Day 1
9:00 am – 9:45 am	Topic 7: Sensitivity Coefficients & Mathematical Models
9:45 am – 10:30 am	Topic 8: Combined & Expanded Uncertainty Calculations
10:30 am – 10:45 am	**Morning Tea Break**
10:45 am – 11:30 am	Topic 9: Developing an Uncertainty Budget
11:30 am – 12:30 pm	Topic 10: MU for Testing Laboratories – Practical Examples
12:30 pm – 1:30 pm	**Lunch Break**
1:30 pm – 2:30 pm	Topic 11: MU for Calibration Laboratories – Practical Examples
2:30 pm – 3:30 pm	Topic 12: Decision Rules & Statements of Conformity
3:30 pm – 3:45 pm	Afternoon Tea Break
3:45 pm – 5:00 pm	Exercise 2: Complete MU Calculation + Budget & Reporting Workshop