



LEVEL 1 BBBEE – 100 % BLACK WOMAN OWNED

## UNCERTAINTY OF MEASUREMENT TRAINING AND IMPLEMENTATION

*YOUR PILLAR IN CUSTOMER DESIGNED TRAINING SOLUTIONS.*



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# UNCERTAINTY OF MEASUREMENT TRAINING AND IMPLEMENTATION

**PRACTICAL!! PRACTICAL!! PRACTICAL!!**

## 1. COURSE OVERVIEW

In metrology, measurement uncertainty is a non-negative parameter characterizing the dispersion of the values attributed to a measured quantity. The GUM defines measurement uncertainty as a parameter, associated with the result of a measurement that characterizes the dispersion of the values that could reasonably be attributed to the measured quantity. This course is intended to simplify this concept and provide an approach that can be applied with ease. The course will begin by a discussion of the origin and importance of measurement uncertainty in real life. In the first technical section the important terminology will be discussed and the applicable statistical tools defined and discussed. The second section dwells on analytical method dissertation in order to identify sources of uncertainty. The last section deals with application of statistical tools leading to calculation of expanded uncertainty. Various approaches of uncertainty will be discussed. The course will conclude with a case study to compute uncertainty for a particular method and a discussion of application of the calculated uncertainty.

## 2. COURSE APPROACH

The approach for this course is **PRACTICAL! PRACTICAL! PRACTICAL!** The course changes the traditional approach of theoretical training and focus on enhancing the practical skills of personnel through case studies, class exercises and real calculation of measurement uncertainty. The facilitator(s) will demonstrate how measurement uncertainty is done for key techniques based on the needs of the majority of attendees. For instance for chemistry the expert facilitator may demonstrate calculations for a chromatography, spectroscopy, mass spectrometry, calorimetric or spectrophotometric method. Whilst for biological sciences techniques such as, Colilert or Somatic Coliphages methods may be topics of interest.

## 3. WHO SHOULD ATTEND?

### Laboratory Personnel:

- Analysts
- Supervisors
- Scientists
- Technical Signatories
- Laboratory Manager

### Quality Assurance Personnel:

- Quality officer or coordinators
- Quality Manager or Scientist
- Nominated Representatives
- Any other laboratory support staff

## 4. ABOUT THE FACILITATOR

The facilitator started off his career as a graduate scientist in an accredited laboratory. His role was primarily in method development, optimization and validation for new methods. The approach was always to develop or optimise methods to address an impending problem in the routine laboratory. He successfully computed measurement uncertainty for several methods which were eventually SANAS accredited for the first time. He was later appointed as a Scientist in the laboratory, leading a team of technicians and technical supervisors in production of accurate test results in good time. This role continued to have a research component where he was involved in troubleshooting, trends analysis, method optimisation for problem solving, maintaining accreditation and increasing scope of accreditation. He boasts with over 10 years' experience in this role. His passion for accreditation grew and was later appointed by SANAS (South African accreditation body) as a SANAS Technical Assessor. This role involves assessment of a number of laboratories in RSA and Africa. He has since gained enormous exposure to measurement uncertainty and experienced various approaches as he visits laboratories. He has implemented measurement uncertainty for tons of different methods which were eventually SANAS accredited. SANAS, noting his passion, got him involved in SANAS Technical Committees for documentation of Technical Requirement Documents. By qualification he holds a BSc Honours in Applied Chemistry and is a Registered Professional Natural Scientist with SACNASP.

## 5. BENEFITS OF THE COURSE

### Benefit to candidate:

- Enhanced practical and applied skills of Measurement Uncertainty, rather than traditional theoretical knowledge
- Paradigm shift in approach to measurement uncertainty from the traditional approach of one template fit all
- Improved practical skills in Microsoft Excel Data Analysis on Analysis ToolPak
- Learning from other delegate's experiences and knowledge

### Benefits to Company:

- Improved customer satisfaction and confidence
- Decreased chances of error leading to decreased client queries
- Claim for skills levies (for companies registered to claim skills levies)
- Knowledge of the measurement uncertainties of tests

### **CUSTOMER DESIGNED IN-HOUSE MEASUREMENT UNCERTAINTY IMPLEMENTATION**

NtsikaTech Solutions subscribes to ensuring value add to the customer rather than selling an incomplete theoretical solution. For maximum value add we suggest in-house training and implementation. In this case the training is designed against the scope of work of the laboratory. The data used is produced from the laboratory. In this approach there will be three outcomes for the laboratory at the end:

**(1.) Trained personnel (2.) Calculated uncertainty for method(s) and (3.) Revised operating procedure.**

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## 6. COURSE STRUCTURE AND DAILY SCHEDULE

An overview of the topics covered in each day is listed below. The details of topics to be covered are withheld for intellectual proprietary reasons but will be made available to interested organisations or individual:

### DAY 1

#### Introduction

- Various measurement uncertainty definitions
- Discussion of problem statement covering challenges observed if a measurement uncertainty is not computed
- Origin and importance of measurement uncertainty in real life
- UoM Purpose and Accreditation Requirements

#### Measurement Uncertainty Terminology

- Discussion of terminologies used in UoM in context with training and accreditation requirements

#### Statistical Tools

- Introduction and definition of various statistical tools
- Tools discussed and briefly demonstrated on Microsoft Excel

#### UoM Approaches

- Discussion of budget method vs “Accuracy and Precision” summary method
- Prediction Approach vs Outcome Based Approach

### DAY 3

**PRACTICAL! PRACTICAL! PRACTICAL!**

#### Measurement Uncertainty Demonstration For A Chosen Or Relevant Technique(s):

- A “DATA BOOKLET” which has typical data collected from validation of method will be issued
- UoM calculated from start to finish using data from the booklet
- Demonstration of calculations and various approaches depending on the data available

### DAY 4 – (In-house Only)

**PRACTICAL! PRACTICAL! PRACTICAL!**

#### UoM Calculated For Laboratory Methods:

- If the course is offered in-house this section is done with real data from the laboratory
- The laboratory is allowed a couple of days to collect required data
- Day 4 is done after the data is available
- The laboratory is left with complete UoM report and reviewed UoM procedure

### DAY 2

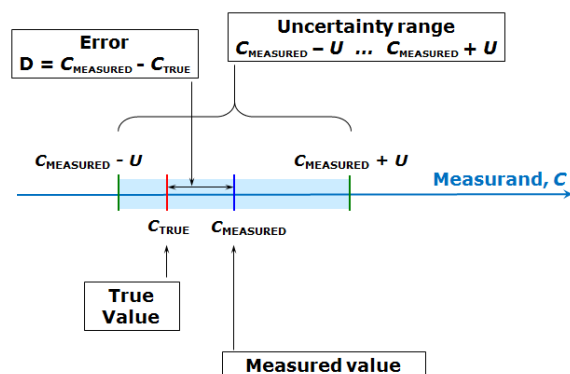
#### Method dissertation and identification of uncertainty sources

- Identification of Type A uncertainty sources
- Identification of Type B uncertainty sources

#### Calculation of UoM – Application of Stat Tools

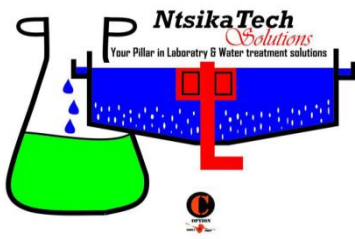
- Data Collection required for each source
- Data Analysis through application of statistical tools
- Data Interpretation using pre-set criteria

#### Demonstration using GUM Example



NtsikaTech Solutions Pty Ltd.

Company Registration Details | Reg. No: 2017/145407/07 | Tax No: 9133099235  
Address: 7 Pepworth Road, Scottsville, Pietermaritzburg, 3201



# MEASUREMENT UNCERTAINTY TRAINING AND IMPLEMENTATION



## BOOKING AND REGISTRATION FORM

COMPLETED BOOKING FORMS MUST BE SCANNED AND EMAILED TO: [s.s.mbovu@gmail.com](mailto:s.s.mbovu@gmail.com)

Company Name: \_\_\_\_\_ VAT No: \_\_\_\_\_  
 Physical Address: \_\_\_\_\_  
 Contact Person: \_\_\_\_\_  
 Telephone No: \_\_\_\_\_ Email: \_\_\_\_\_

Training Selection	INHOUSE:	OFF-SITE:	No of Delegates:	No of Methods for UoM:
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Delegate 1 Name: \_\_\_\_\_ Position: \_\_\_\_\_  
 Delegate 2 Name: \_\_\_\_\_ Position: \_\_\_\_\_  
 Delegate 3 Name: \_\_\_\_\_ Position: \_\_\_\_\_  
 Delegate 4 Name: \_\_\_\_\_ Position: \_\_\_\_\_  
 Delegate 5 Name: \_\_\_\_\_ Position: \_\_\_\_\_

### TRAINING APPROVAL

Name of Approver (Delegated/Authorised): \_\_\_\_\_  
 Position: \_\_\_\_\_ Employee No: \_\_\_\_\_  
 Telephone No: \_\_\_\_\_ Email: \_\_\_\_\_

#### PAYMENT METHOD

Electronic Funds Transfer to:  
 Account Holder: NtsikaTech Solutions Pty Ltd  
 Name of Bank: First National Bank  
 Account No: 62693358931  
 Branch Name: Howick, Pmb

#### TERMS AND CONDITIONS

- All payments must be made directly to NtsikaTech Solutions Pty Ltd.
- Payment is required in full 7 days from date of invoice
- No seats will be reserved unless and authorised registration form is received.
- Though all efforts will be made not to, however NtsikaTech Solutions (PTY) Ltd. reserves the right to change speakers, program content, date & venue in if circumstances beyond our control prevail
- The signed registration form is a legally binding contract.

#### COSTING APPROACH

**In-house Training:** A combination of the minimum number of delegates and/or number of methods requiring validation will be used in costing in-house training (e.g.: in-house training may be done for 1 delegate if a significant number of methods require validation. Whereas a minimum number of delegates may be required where only one method will be validated). Tea and Lunch is not included on costs of an in-house training. **Off Site Training:** The costs exclude travel and accommodation, but include training material and refreshments. If one company registers more than 3 delegates, discounts may be granted.

#### SUBSTITUTIONS/EVENT RESCHEDULING

Delegates must inform NtsikaTech Solutions (PTY) Ltd in writing of any delegate substitutions. There is no charge for substitutions. NtsikaTech Solutions (PTY) Ltd will not be held liable for incorrect Delegate details on certificates in the event of substitutions being made on the day of the training. In the event of NtsikaTech Solutions (PTY) Ltd having to cancel or postpone an event due to circumstances beyond our control, delegates will be notified in reasonable time and allowed time to adjust to new dates. There will be no refunds or credit vouchers for non-attendance.

#### REGISTRATION CANCELLATIONS

All cancellations will be subject to approval by the management of NtsikaTech Solutions (PTY) Ltd. All cancellations made 7 working days prior to date of the event will be subject to a 50 % cancellation fee (50 % refund). Cancellations made within 7 days of date of the event, will be subject to a 100 % cancellation fee (no refund). In an event where cancellations results to a significant change on the number of delegates from the same company, NtsikaTech Solutions (PTY) Ltd reserves the right to revise the costs accordingly.

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