



NEL

Choose certainty.  
Add value.

## Introduction to Measurement Uncertainty Training Course



### About the Course

Measurement is fundamental to the control of quality, efficiency and safety. This one day course is designed to impart a basic understanding of measurement uncertainty. Delegates will learn about the impact of uncertainty in industry, to identify important sources of uncertainty in measurement systems and receive practical guidance on the design of measurement techniques to minimise uncertainty. This course is a prerequisite for NEL's Practical Applications of Measurement Uncertainty Training Course.

National  
Measurement  
System





## Introduction & Objectives

Measurement is fundamental to the control of quality, efficiency and safety. It is vital that all those using industrial measurement recognise that measurement is not an exact science. Understanding the magnitude of the uncertainty associated with any measurement is the first step to improving accuracy. An ability to identify the key issues affecting accuracy is the crucial step in ensuring that limited resources are correctly targeted in any drive to improve accuracy.

This course will introduce delegates to the techniques required to identify what affects measurements and by how much. By ranking the effects, delegates will be able to guard against invalid conclusions and ensure that the key measurements are targeted for investment in new instrumentation.

The course is designed to impart a basic understanding of measurement uncertainty. Delegates will learn the appreciation of the impact of measurement uncertainty within the industry, to identify the important sources of uncertainty in measurement systems and receive practical guidance on the design of measurement techniques for improved uncertainty.

This course is a prerequisite for NEL's Practical Applications of Measurement Uncertainty course which expands delegates knowledge using examples tailored to the oil and gas sector to reinforce the basic principles introduced in this course.

## Who Should Attend

- Research and Development Engineers
- Instrumentation Engineers
- Quality Managers
- Technical Managers

## Enquiries

The course is delivered regularly at various international locations, but is also available as an in-company (private) course. It includes comprehensive course notes which will form useful reference material in the future. Enquiries about course dates and delegate fees can be made by emailing [events@tuvnel.com](mailto:events@tuvnel.com) or by telephoning the Events Team on **+44 (0) 1355 593704**.

## About NEL

NEL is a leading provider of measurement services to the world's Oil and Gas Industry, and is the custodian of the UK's National Standard for Flow Measurement. We provide services in;

- Measurement consultancy
- Meter development and calibration
- Flow metrology research and development
- Multiphase and wet gas testing
- Erosion
- Environmental
- CFD modelling
- Training and knowledge transfer



## Introduction to Measurement Uncertainty Training Course

### Course Programme (Illustrative)

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0830 – 0845      **REGISTRATION AND COFFEE**

**Module 1: Overview of Uncertainty Concepts**

- An Introduction to the basic terminology and concepts of uncertainty

**Module 2: Basic Calculation Methods Type A Analysis**

- Handling repeated measurements; assessing probability

1005 – 1025      **COFFEE**

**Module 3: Basic Calculation Methods Type B Analysis**

- Handling repeated measurements; assessing probability

**Module 4: Sensitivity Coefficients**

- The vital link between what you measure and the required output

**Module 5: Combination of Uncertainties**

- Finding the overall uncertainty and expressing the result

1225 – 1310      **LUNCH**

**Module 6: Practicalities of Uncertainty Estimation and How to Improve Measurement**

- An engineering approach designed to focus on the key issues

**Module 7: Correlation**

- One instrument or measurement used for more than one parameter

1430 – 1450      **COFFEE**

**Module 8: Monte Carlo Simulation Including Worked Example**

- Computer-based simulation of the uncertainty problem, its advantages and disadvantages

**Final Group Discussion and Questions**

1630      **SUMMARY AND CLOSE**



To enquire about this Course  
please contact:

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