Implementing Metrology and SPC concepts with Microsoft Excel

This one-day workshop prepares the metrology professional to apply the power of Microsoft Excel's mathematical and statistical tools to assist in managing the laboratory's Quality Management System including Measurement Uncertainty. It serves as a prerequisite for the Measurement Uncertainty workshop and reduces the time spent learning both the Excel and Measurement Uncertainty estimation techniques at the same time.

Learning objectives:

1. Obtain familiarity of Excel mathematical and statistical functions
2. Learn Excel shortcuts for transforming number formats and other similar techniques.
3. Charting and using trend analysis tools for data interpolation.

Attendees will become proficient at applying Excel's mathematical and statistical tools by building templates for data collection and measurement uncertainty estimation.

Course Content:

- Excel basic statistical functions.
- Basic statistics required for measurement uncertainty.
- Applying Excel statistics for Measurement Uncertainty.
- Developing a Measurement Uncertainty spreadsheet.
- Validation of Spreadsheet.
- Central Limit Theorem.
- Sources of variation.
- Problems related to over-adjusting the process.
- Types of variable SPC (Statistical Process Control) charts.
- Types of attribute SPC (Statistical Process Control) charts.
- Individual/Moving Range Chart Methods.
- X-Bar/Range Chart Methods.
- Troubleshooting Control Charts and improving processes.
- Use of control charts to manage in Test and Calibration laboratory environments.
- Using control charts to comply with ISO 17025 requirements.

It is recommended the student bring a laptop.

Registration Fee: $395 per person

SPECIAL BUNDLE PACKAGE: Register for a full week of workshops for $1395.00 (Save $480.00).
Weekly packages are for SPC, Force Calibration, and Advanced M.U. or ISO 17025.

Force Calibration Workshop

This two-day workshop will cover applied force calibration techniques with hands on activities and demonstrations using primary and secondary standards. Demonstrations will expose potential errors made in everyday force measurements. The demonstrations and discussions will include errors associated with:

- Improper alignment;
- Use of different and/or incorrect adapter types;
- Different thread depth;
- Wiring and excitation;
- Trouble shooting a load cell;
- Trouble shooting a load cell;
- Bottom thread loading.

The workshop will include discussions on measurement uncertainty and provide the tools for anyone to put together a calibration and measurement capability (CMC) or uncertainty budget.
This workshop will provide examples and worksheets that can be applied to estimate measurement uncertainty required by ISO/IEC 17025 and ANSI Z540.3.

Course Content:

- Common types of force measuring instrumentation;
- Calibration traceability;
- ASTM E74 and other force calibration procedures;
- Requirements for ISO/IEC 17025 and ANSI Z540.3;
- Basic definitions relating to measurement uncertainty (GUM process simplified);
- Basic statistics required for measurement uncertainty;
- The measurement uncertainty budget implemented in a spreadsheet (template provided); and
- Reporting measurement uncertainty (on a Scope of Accreditation, CMC and customer reports in accordance with ILAC P-14 requirements).

It is recommended the student bring a laptop.

Registration Fee: $750.00 per person

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Weekly packages are for SPC, Force Calibration, and Advanced M.U. or ISO 17025.

Advanced Measurement Uncertainty

This workshop covers techniques for laboratories in estimating the measurement uncertainty for their scope of accreditation. This workshop takes the approach of teaching several tools and techniques that a lab may apply in measurement uncertainty analysis estimation per ISO Guide 98 (GUM). The tools are generic in nature so that it can be applied to various parameters.
Hands on exercises using Microsoft Excel spreadsheet provide a practical approach that enables the attendees to apply the methods in their particular applications. Several Excel Templates and tools are provided for the attendees to implement.
Please bring a laptop with Microsoft Excel or compatible spreadsheet loaded in the computer for a truly interactive workshop.

Learning Objectives:

- What are the minimum contributors for a laboratory to consider for measurement uncertainty estimation?
- How are contributors considered for inclusion in the uncertainty budget?
- How to build a Measurement Uncertainty Budget and interpret it for future improvement of the measurement process?

It is recommended the student bring a laptop.

Registration Fee: $750.00 per person

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Weekly packages are for SPC, Force Calibration, and Advanced M.U. or ISO 17025.

ISO/IEC 17025 Implementation

This 2-day workshop provides a general framework of tools for the laboratory seeking ISO/IEC accreditation. Attendees shall learn how to interpret the standard and what is required of the laboratory to successfully get accredited the first time. Time saving techniques and tools are shared so that the laboratory does not fail major criteria for accreditation.

Course Content:

- ISO/IEC 17025 Clause 4 Management Requirements
- ISO/IEC 17025 Clause 5 Technical Requirements
    - Purchasing process and review
    - Metrological Traceability and Measurement Uncertainty
    - Internal Auditing techniques
    - Corrective and Preventive actions including Root Cause Analysis
    - Closing an audit action item
    - Audit exercises
    - Records Management

Registration Fee: $750.00 per person

SPECIAL BUNDLE PACKAGE: Register for a full week of workshops for $1395.00 (Save $480.00).
Weekly packages are for SPC, Force Calibration, and Advanced M.U. or ISO 17025.