



NSAI

National Metrology Laboratory

2024 Programme of Training Courses in Measurement & Calibration

NSAI National Metrology Laboratory offers public courses to help individuals gain the skills that they require in the field of Measurement and Calibration. The courses detailed in this brochure are shown below.

Courses are to be held on-line, in NML or in-company on request. Additional courses may also be arranged on demand. All the tutors are experts in their field, and have extensive experience in training.

Understanding the principles of Measurement and Calibration can lead to better decisions on product purchasing, reduced need for expensive technical support and reduced operational mistakes with expensive consequences.

Please book online at
www.nsai.ie or return the booking form
to:

NSAI NATIONAL METROLOGY LABORATORY

Caroline Tyndall
Course Reservations
Glasnevin, Dublin 11
D11 E527 Ireland

Telephone +353 1 808 2609/2605
Facsimile +353 1 808 2603
Email nml@nsai.ie

Keep up with NSAI news

Subscribe to NSAI Ezine

www.nsai.ie/NSAI-Ezine

Follow NSAI Tweets

[@NSAI_Standards](https://twitter.com/NSAI_Standards)

Watch NSAI Media

www.youtube.com/user/NSAImedia

Read NSAI LinkedIn

www.linkedin.com/company/national-standards-authority-of-ireland

NSAI.ie



NSAI

National Metrology Laboratory

Name:

Title:

Company:

Address:

Telephone:

Email:

Course title(s):

Date of Course(s):

Names of attendee(s):

P.O.

Cheque / VISA / LASER (please circle)

Card No:

Expiry Date:

Security No:

Amount:

Signature:

Date:

CANCELLATIONS: Cancellations should be made 2 weeks in advance. Cancellations made within 2 weeks of course date will incur a charge of 50% of the course fee. Substitutions may be made at any time.

COURSE DETAILS

PAGE

FOUNDATION COURSE IN MEASUREMENT & CALIBRATION	1
EVALUATING MEASUREMENT UNCERTAINTY	2
PRACTICAL DIMENSIONAL CALIBRATION	3
PRACTICAL TEMPERATURE MEASUREMENT & CALIBRATION	4
WEIGHTS AND BALANCE CALIBRATION	5
ELECTRICAL MEASUREMENT & CALIBRATION	6
TEMPERATURE / HUMIDITY MAPPING OF ENCLOSURES	7
PRACTICAL HUMIDITY MEASUREMENT AND CALIBRATION	8
ISO17025 - A METROLOGY PERSPECTIVE	9
Introduction to Measurement Uncertainty	10

CT001

FOUNDATION COURSE IN MEASUREMENT & CALIBRATION

(Accredited by Engineers Ireland)

DATES:

2 Feb, Online
1 Mar, In-Person
4 June, In-Person
24 Oct, In-Person

DURATION OF COURSE:

9.30am-2.30pm
Online

9.30am - 4.30pm
In-Person

VENUE:

Online/ NML

ONLINE FEE:

€250

IN-PERSON FEE:

**€480 (including
documentation,
lunch and
refreshments)**

This training course is intended for professionals who are new to the field of calibration or who are responsible for the management and administration of an in-house calibration system.

COURSE CONTENT

- Measurement Standards and Traceability
- Measurement Uncertainty
- Test Uncertainty Ratio
- Instrument Accuracy Specification
- Calibration Certificates
- Recalibration Intervals
- Laboratory Accreditation
- Tour of NML facilities

Tuition will consist of classroom work, exercises and practical demonstrations.

Cancellations within 2 weeks of course date will incur a charge of 50% of the course fee.

CT002 EVALUATING MEASUREMENT UNCERTAINTY

(Accredited by Engineers Ireland)

This training course is intended for professionals who perform or manage critical measurement/calibration tasks and who need to evaluate the measurement uncertainties associated with their measurement results. The course is based on the internationally accepted method given in the Guide to the Expression of Uncertainty in Measurement.

COURSE CONTENT

- The importance of measurement uncertainty
- Understanding and modelling the measurement process
- Statistical tools for uncertainty evaluation
- Identifying and assessing measurement input quantities
- Using Excel© to formulate an uncertainty budget
- Combining standard uncertainties
- Reporting the measurement uncertainty
- Worked examples and exercises on uncertainty evaluation

Tuition will consist of classroom work, exercises and practical sessions.

*Note: Extra half day option available to discuss user specific uncertainty evaluations.
(price on request)*

Cancellations within 2 weeks of course date will incur a charge of 50% of the course fee.

DATE:

9 April

12 November

In-Person

DURATION

OF COURSE:

9.30am-2.30pm

Online (on

request)

(2 x 1/2 days)

9.30am - 4.30pm

In house

VENUE:

In NML or

Online on request

ONLINE FEE:

€250

IN HOUSE FEE:

€480 (including documentation, lunch and refreshments)

CT003

PRACTICAL DIMENSIONAL CALIBRATION

DATES:
17 April
7 August

9.30am - 4.30pm
In house

VENUE:
NML or
in-company by
arrangement

FEE: €480
(including
documentation,
lunch and
refreshments)

This training course is intended for professionals who make dimensional measurements on components and for people who are responsible for the calibration of dimensional measuring instruments. The emphasis of this training course is on the practical aspects of dimensional measurement and calibration.

This course provides the knowledge and expertise for people who use measurement tools or require an appreciation of the importance of measurement, calibration and the use of dimensional measurement techniques to complete their daily tasks.

COURSE CONTENT

- Principles of Measurement and Calibration
- Dimensional units, traceability, and standards
- Uncertainty of Measurement
- Specifications and tolerances - interpretation of BS/ISO Specifications
- Usage, storage and handling of dimensional standards and artefacts
- Calibration of calipers, micrometers and dial gauges
- Use of gauge blocks in dimensional calibration
- Recording calibration results and reviewing calibration certificates
- Error avoidance tactics for dimensional measurements

Tuition will consist of classroom work, exercises and practical demonstrations.

Cancellations within 2 weeks of course date will incur a charge of 50% of the course fee.

CT004

PRACTICAL TEMPERATURE MEASUREMENT & CALIBRATION

(Accredited by Engineers Ireland)

The training course is intended for professionals who are responsible for the calibration of temperature measuring instruments and standards. The emphasis is on the practical aspects of temperature measurement and calibration.

The course provides the knowledge and expertise for those who use temperature measuring devices or require an appreciation of the importance of measurement, calibration and the use of temperature instruments and standards in the performance of their daily tasks.

COURSE CONTENT

- Principles of Temperature Measurement and Calibration
- Temperature Units, terminology, traceability and standards
- Thermometer Types: Thermocouples, Liquid in Glass thermometers, Platinum Resistance Thermometers and Thermistors
- Accuracy of Thermometers
- Temperature Mediums: Liquid Baths, Dry Blocks, Ovens
- Thermometer usage, selection and application - Sources of errors
- In-house calibration methods i.e. profiles in ovens

Tuition will consist of classroom work, exercises and practical sessions.

Cancellations within 2 weeks of course date will incur a charge of 50% of the course fee.

DATES:
27 March
23 October
In-Person

DURATION
OF COURSE:

9.30am - 4.30pm
In-Person

VENUE:
In NML or
in-company by
arrangement

FEE: **€480**
(including
documentation,
lunch and
refreshments)

CT005 WEIGHTS & BALANCE CALIBRATION

DATES:

**6 May
11 September
In-Person**

9.30am - 4.30pm

VENUE:

**NML or
in-company by
arrangement**

**FEE: €480
(including
documentation,
lunch and
refreshments)**

This training course is intended for those professionals who are responsible for the calibration of weighing machines and the maintenance of associated mass standards. The emphasis of this one day training course is on the practical aspects of mass measurement.

The course is designed to provide participants with an understanding of weighing machines and mass standards and covers topics such as mass classification, mass standards, calibration procedures and environmental influences.

COURSE CONTENT

- Review of general calibration principles
- Mass units, traceability, and standards
- Mass classification - construction, material, tolerances
- Mass standards - usage, storage and handling
- Selection of mass standards for in-house balance calibration
- Calibration of weighing machines and balances
- Minimum weight requirements
- Brief introduction to uncertainty of measurement
- Error avoidance tactics for mass measurements

Tuition will consist of classroom work, exercises and practical demonstrations.

Cancellations within 2 weeks of course date will incur a charge of 50% of the course fee.

CT006

ELECTRICAL MEASUREMENT & CALIBRATION

The training course is intended for calibration professionals who are responsible for the calibration of electrical measuring instruments (DC and low frequency). The emphasis is on the practical aspects of electrical calibration.

COURSE CONTENT

- Review of general calibration principles
- Electrical units, traceability, and standards
- Calibration of hand-held digital multimeters
- Calibration of current and voltage sources
- Calibration of decade resistance boxes
- Error avoidance tactics for electrical measurements
- Further topics *

*As far as is possible, the course content is tailored to meet the specific needs of participants. This is done by means of a questionnaire which is sent to intending participants prior to the course.

Tuition will consist of classroom work, exercises and practical sessions.

Cancellations within 2 weeks of course date will incur a charge of 50% of the course fee.

DATES:
24 October
In-Person

9.30am - 4.30pm

VENUE:
In NML or
in-company by
arrangement

FEE: €480
(including
documentation,
lunch and
refreshments)

CT009

TEMPERATURE / HUMIDITY MAPPING OF ENCLOSURES

DATES:

**13 March
9 October**

**DURATION
OF COURSE:**

**9.30am - 4.30pm
In house**

VENUE:

**In NML or
in-company by
arrangement**

**FEE: €300
(including
documentation,
lunch and
refreshments)**

The training course is intended for professionals involved in using, maintaining and calibrating temperature/ humidity chambers and enclosures and for those with responsibility for managing the enclosure calibration programme.

The emphasis of this course is on the best practice and review of relevant internationally accepted methods for enclosure mapping.

COURSE CONTENT

- Overview & introduction
- Temperature Mapping of Enclosures including latest Guidelines and Standards
- A comparison of Enclosure Validation Techniques as described in IEC 60068
- Calibration & mapping Techniques for temperature/ humidity enclosures

Tuition will consist of classroom work, exercises and practical demonstrations.

Cancellations within 2 weeks of course date will incur a charge of 50% of the course fee.

CT011

PRACTICAL HUMIDITY MEASUREMENT & CALIBRATION

(Accredited by Engineers Ireland)

DATES:
5 June

DURATION:
1 day

VENUE:
In NML or
in-company by
arrangement

FEE:
€500 (including
documentation,
lunch and
refreshments)

The training course is intended for those who are responsible for the calibration of humidity measuring instruments and standards.

The emphasis is on the practical aspects of humidity measurement and calibration.

The course provides the knowledge and expertise for professionals who use humidity measuring devices or require an appreciation of the importance of measurement, calibration and the use of humidity instruments and standards in the performance of their daily tasks.

COURSE CONTENT

- Principles of Humidity measurement
- Hygrometric definitions, units, terminology, traceability
- How hygrometers work
- Types of hygrometers used in industry:
Dew point instruments, Psychrometer, RH Instruments and Salt solutions
- Measurement uncertainty with particular reference to Climatic chambers, rooms
- Practical advice on applications

Tuition will consist of classroom work, exercises and practical demonstrations.

Cancellations within 2 weeks of course date will incur a charge of 50% of The course fee.

CT015

ISO17025 - A METROLOGY PERSPECTIVE

The training course is intended for those professionals involved in meeting the requirements of ISO17025 in a calibration laboratory.

The emphasis of this training course is on the specific elements of the ISO17025:2017 standard relating to traceability, decision rules and reporting of measurement uncertainty.

COURSE CONTENT

- Meeting metrological traceability requirements
- Calculating and reporting measurement uncertainty
- Reporting statements of conformity
- Application of Decision Rule

DATES:

On Demand

DURATION:

1/2 day

VENUE:

On-Line

FEE:

€250

CT016

An Introduction to Measurement Uncertainty

The training course is intended for those professionals who need to obtain a basic understanding of measurement uncertainty and how it effects measurement results and how it is applied and used in a range of measurements. The course will also examine the impact of measurement uncertainty on compliance statements.

COURSE CONTENT

- Measurement errors and their sources
- Measurement uncertainty and its effect on measurement results
- How to handle measurement errors
- Evaluating measurement uncertainty for analytical measurements
- Impact of uncertainty on compliance statements

DATES:

On Request

DURATION:

1/2 day

VENUE:

On-Line

FEE:

€250