
Calibration Laboratory Operations

Course No. 134

FOR WHOM INTENDED This course is for individuals who are involved in standards and calibration laboratories and for others who want a clear understanding of the special requirements that must be met by managers and other personnel in standards and calibration work.

This course is applicable to individuals from a wide range of industries such as Defense, Manufacturing, Utilities, Electronics, Automotive, Medical, Telecommunications, Computers, Aerospace and Universities.

BRIEF DESCRIPTION OF COURSE The course begins with a broad overview of the Metrology discipline, and defines some common terms. It next introduces the statistical concepts that form the cornerstones of modern metrology and calibration. The students are then exposed to statistical management concepts such as Statistical Process Control (SPC) and the Measurement Assurance Process (MAP).

The course then reviews in considerable depth the requirements imposed by ISO standard 17025. Its impact on all aspects of calibration laboratory management is analyzed clause by clause. The role of ISO 9000 quality programs vis-à-vis ISO standard 17025 is discussed.

After a discussion of the staffing requirements of standards and calibration labs, and applicable documentation requirements, the course next reviews measurement uncertainty, and attempts to dispel some of the confusion surrounding this complex subject. Valuable insights into Inter-laboratory testing, calibration and comparison (ILC) will be provided.

The final sections of the course deal with laboratory facilities, equipment and calibration logistics, as well as reporting requirements, ESD control, equipment handling and safety considerations.

DIPLOMA PROGRAMS This course may be used as an optional course for any [TTi specialist diploma program](#).

PREREQUISITES There are no definite prerequisites for this course. However, this course is aimed toward individuals involved in a related technical field.

TEXT Each student will receive 180 days access to the on-line electronic course workbook. Renewals and printed textbooks are available for an additional fee.

COURSE HOURS, CERTIFICATE AND CEUS

Class hours/days for on-site courses can vary from 14–35 hours over 2–5 days as requested by our clients. Upon successful course completion, each participant receives a certificate of completion and one Continuing Education Unit (CEU) for every ten class hours.

ON-DEMAND OnDemand Internet Complete Course 134 features ten hours of video as well as more in-depth reading material. All chapters of course 134 are also available as OnDemand Internet Short Topics. See our on-line course outline for details.

Course Outline

Relationship of Metrology and Calibration to Quality System

Methodologies for a Calibration Program • Metrology Glossaries
International Definitions • ISO 9000 Quality System • Error, Accuracy, Precision • Measurement Uncertainty • Measurement Process
Calibration Control System • Measurement Assurance Process (MAP)
Statistical Process Control (SPC) • Check Standards in SPC
Standard Reference Materials • Quality / Reliability Goals
Risk Management • Calibration System—Purpose and Justification

Calibration System

Government Agencies • History of Calibration Requirements
Conforming to International Definitions • International Standards
ISO Standard 17025 Requirements: Management System • Laboratory Procedures • Corrective and Preventive Action • Management Review • Technical • Laboratory Personnel Job Description • Test and Calibration Methods • Estimation of Measurement Uncertainty • Measurement Traceability • Sampling • Reporting of Results
ISO 9000—Accreditation, Certification, Registration • Proficiency Testing

Calibration Program and Metrology Management

Program Manager • Technical Management • Quality Manager
Quality Systems Considerations • Documentation Requirements
Calibration Control System • Quality / Calibration Manual

New Concepts in Metrology

Measurement Uncertainty • Measurement Uncertainty Evaluation
Standard Uncertainty • Expanded Uncertainty • Glossary • Error Sources
Type A and Type B Error Evaluation • Confidence Levels
Measurement Uncertainty Summary • Measurement Assurance
Inter-Laboratory Testing, Calibration • Inter-Laboratory Comparison (ILC)

Administrative Considerations in Metrology

Metrology Personnel: Technicians, Engineers, Management and Support
Metrology Document Types • Test and Calibration—Procedures

Tools of the Metrology Trade

Laboratory Facilities • Floor Space • Equipment • Logistics
Environmental Control • Recommended Environment for Electrical Measurements; for Dimensional Measurements
Equipment and Measurement Standards • Adequacy of Standards

Calibration Logistics

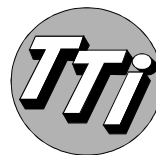
Calibration Intervals • Calibration Status
Exclusions from Calibration System • Tamper Proof Sealing
Recall System • Reverse Traceability

Reports, Records, Safety and Equipment Handling

Calibration Reports: Requirements • Calibration Records
ESD Control in the Calibration Laboratory • Safety Considerations
Precision Equipment Handling/Storage • Preventive Maintenance (PM)
Ethical Considerations

Summary, Discussion

Award of Certificates for Successful Completion



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