

Course Outline

Day One: Determination of Course Goals & Introduction to ISO 17025 Requirements

- ISO 17025 contents
- Organization – Responsibilities
- Introduction to control of documents & records – Use of LIMS for managing records
- Requests for tenders
- Suppliers/Subcontractors – Detailed record keeping through LIMS
- LIMS design – Basic considerations

Day Two: Service to the Customer & Internal Audits as a Tool for Quality Assurance

- Service to the customer - Complaints
- Control of non-conforming work/testing
- Corrective/Preventive actions – Implementation & Monitoring of corrective actions
- Control of records
- Internal auditing as a tool for addressing complaints & implementing a proactive strategy
- Management review

Day Three: Technical Requirements – Personnel and Test method Development

- Technical records – LIMS as a unique traceability tool
- Personnel (scientific, technical, administrative)
- Accommodation & Environmental conditions
- Test methods & Method validation. Estimation of uncertainty of measurement
- Selection of methods – laboratory-developed methods, Non-standard methods
- Control of data for all of the above topics – Use of LIMS as a data recording tool

Day Four: Technical Requirements – Equipment and Quality Assurance

- Measurement traceability through LIMS
- Equipment – Measurement traceability, Reference standards & Reference materials
- Sampling – Handling of test items & The role of LIMS as the first link in the sample traceability chain (from sample login to issue of Test Certificate)
- In-house testing & subcontracted analysis. Issuing of relevant working forms using the LIMS
- Quality Assurance (QA) of test results & Ways of reporting the test results – The LIMS contribution to assuring traceability of QA and Analytical data

Day Five: Technical requirements – Test reports, Implementation of LIMS & Accreditation Requirements

- Format of Test Certificates & Amendments of Test Certificates – Use of LIMS for issuing Test Certificates and keeping track of changes
- Opinions & Interpretations (O&I's) on Test Certificates
- Electronic transmission of results – LIMS contribution to assist in speedy, targeted and foolproof delivery of results
- Preparation & Application for accreditation

- Role-playing – Internal/External audits exercise

Course Outline:

- Repeatability and reproducibility
- Optimization design
- Outliers test
- Detection limit
- Confidence limit
- Standard deviation
- Errors in quantitative analysis
- Standard addition-extrapolated method
- Calculation of analytic concentration
- The correlation coefficient
- Instrumental graph-interpolated method
- Calibration using external and internal standards
- Evaluation of peaks area
- Column resolution
- Column efficiency
- Selectivity factor
- Capacity factor
- Making measurements and reporting:
- Introduction to lab quality and accreditation
- Lab Quality Management Requirements ISO 17025 (organization, quality system, document control, review of contracts, subcontracting, purchasing, service to the client, complaints, control of non-conforming work, improvement, corrective actions, preventive actions, control of quality records, internal audits, management review).
- Lab Quality Technical Requirements ISO 17025 (personnel, accommodation, test methods and validation, equipment, measurement traceability, sampling, test items, quality control, reports/calibration certificates) □ Quality in the laboratory:
 - Quality of the sample
 - Analytic manipulation technique
 - Selecting the method
 - Glassware and equipment
 - Instrumental technique
 - Preparation
 - Validation of analytical methods
 - Quality management functions
 - Laboratory accreditation

Modern Analytical Laboratory Management involves several key areas of focus, including operations, analytical instrumentation, equipment, safety, and quality (ISO 17025). Operations refer to the day-to-

day activities of the laboratory, such as sample preparation, analysis, data management, and reporting. These processes should be standardized and optimized to ensure efficiency and accuracy.

Analytical instrumentation includes the tools and equipment used to conduct analyses, such as chromatographs, spectrophotometers, and mass spectrometers. These instruments should be properly maintained and calibrated to ensure accurate and reliable results. Equipment management involves the acquisition, installation, and maintenance of laboratory equipment. This includes inventory management, preventative maintenance, and repair and replacement.

Safety is a critical consideration in the laboratory, as many chemicals and processes can pose significant risks to health and safety. Proper safety protocols and training should be implemented and maintained to ensure a safe working environment. Quality management is an essential component of modern laboratory management, with the International Standard ISO 17025 providing a framework for establishing and maintaining quality systems in laboratories. This includes quality control procedures, proficiency testing, and management review.

By focusing on these key areas, modern analytical laboratory management can ensure the delivery of high-quality results that meet the needs of clients and stakeholders while ensuring the safety of laboratory staff and the environment.