

# Modern Chemical Laboratory

## INTRODUCTION

- In today's highly competitive market environment, where fast and reliable laboratory results play an important role in decision making and process control, it is of paramount importance that laboratory personnel are adequately trained on the fundamental principles of laboratory operation.
- This Modern Chemical Laboratory training course will assist in keeping up to date with current laboratory operation principles and international guidelines, while at the same time stressing the importance of and providing valuable advice on the most critical areas of testing laboratories operation. These will include, but not be limited to, the areas of method development and method validation, environmental conditions, equipment maintenance and control, quality assurance of test results, measurement uncertainty and sample traceability, personnel training, internal audits, proactive / preventive actions and root cause analysis.

Participants attending the Modern Chemical Laboratory training course will develop the following competencies:

- Update their knowledge on modern laboratory operation
- Become aware of the latest developments in laboratory accreditation
- Develop their skills in providing an improved service to the customer
- Improve the competitive position of their laboratory in the market
- Help their organization to optimise their testing laboratory operation and activities

## PROGRAMME OBJECTIVES

This Modern Chemical Laboratory training course aims to help participants to achieve the following objectives:

- Define the role and objectives of their laboratory within an organization
- Understand the importance of quality control
- Develop their skills in method development and method validation
- Improve their skills in the area of equipment maintenance and operation
- Realize the need for data control and method documentation
- Understand the concept of traceability within laboratory activities
- Be able to raise Corrective / Preventive actions and subsequent root cause analysis
- Perfect their skills in conducting Internal Audits and Management Reviews

## WHO SHOULD ATTEND?

This training course is suitable for a wide range of professionals employed in Chemical Laboratories, but it will be particularly beneficial to:

- Laboratory Managers
- Scientific Personnel of Laboratories, like Chemists, Chemical Engineers, Environmental Engineers, Process / Shift Engineers
- Laboratory Technicians and newly recruited staff of chemical laboratories
- Instrument Operators in chemical laboratories

## TRAINING METHODOLOGY

- This training course will combine presentations with instructor-guided interactive discussions between participants relating to their individual workplace. Practical exercises, video material and case studies aiming at stimulating these discussions and providing maximum benefit to the participants will support the training.

## PROGRAMME SUMMARY

- This Modern Chemical Laboratory training course covers critical areas of operation of testing laboratories in today's competitive and demanding market environment. Participants will acquire and develop essential skills that will improve their technical competence while at the same time improving the overall laboratory processes that relate to delivering the right service to the customer, at the right time with all supporting and traceable documentation.

## PROGRAM OUTLINE

### Introduction to Modern Chemical Laboratory Operation

- Definition of chemical laboratory
- Chemical laboratories as legal entities under different scenarios
- Inhouse laboratories operating within another organization
- Independent commercial laboratories
- Reference laboratories vs. notified laboratories
- Independence and impartiality of laboratories / legal implications

### Laboratory Location, Layout and Basic Safety Provisions

- Regulatory / legal / environmental requirements relating to laboratory location
- Laboratory Layout – specific examples of different types of chemical laboratories
- Basic rules relating to location of analytical instruments
- Health and safety considerations / emergency response team
- Chemicals handling and storage
- Ventilation and air conditioning requirements

## Laboratory Instrumentation and Equipment

- Defining your needs in analytical equipment
- Selection criteria / Supplier evaluation
- Commissioning of analytical instruments
- Operator training and on-going competence
- Calibration of different types of analytical instruments
- External vs. internal calibration / Calibration standards

## Method Development

- In-house developed vs. Standard versus Rapid-screening methods
- Analytical method validation and verification
- Method documentation and assuring traceability – control of data
- Method Quality Control (QC) – use of reference materials (CRMs)
- Internal / external QC
- Introduction to Uncertainty of Measurement (UoM) / Legal implications

## Laboratory Accreditation

- Introduction to Laboratory Accreditation
- Management requirements of accreditation bodies
- Internal Audits
- Corrective / Preventive Actions – root cause analysis
- Management Reviews
- Technical requirements of accreditation, including sampling activities