# Total Quality Management (TQM) In Laboratory Operations

## Introduction:

The purpose of a laboratory is to extract the information contained in a sample and present it to decision makers who must decide on their further actions based on the laboratory results. The risks of a wrong decision can be enormous. In this course the basic aspects of Quality in Laboratory Operations will be examined from the Total Quality Management (TQM) perspective. This means that all the influences and sources of uncertainty which could cast doubt on the reliability of a laboratory result must be identified and suitably addressed.

## Who Should Attend?

Lab Managers and Supervisors, Chemists and Technicians, Health & Safety and Environmental Professionals, staff responsible for managing hazardous wastes, Laboratory Technicians, Technologists, Analytical Laboratory Professionals, Laboratory Staff, Superintendents, Supervisors, Engineers, Chemists and Analysts, Auditors, Research Directors, anyone working in any analytical

laboratory, Chemical Engineers, Health & Safety Professionals Instrument Engineers and Supervisors who work in laboratory

## Course Objectives:

By the end of this course delegates will be able to:

- A thorough understanding of the factors which could influence the results of laboratory analyses
- The factors, which are important for good laboratory operations
- The use of statistical techniques to estimate the uncertainty in measurements

## Course Outline:

- Introduction to Total Quality Management Concepts
- Laboratory organization based on the TQM concept
- The factors which could affect Measurement Quality
- Quality assurance of chemical measurements
- Introduction to basic statistical concepts
- Refresher exercises on statistics
- Frequency distributions
- Probability
- The normal curve and its properties
- Sources of error
- Confidence intervals
- Principles of measurement
- Sensitivity
- Limits of detection
- Selectivity
- Calibration principles
- Reference materials
- Blank correction
- Traceability
- Standards
- Sampling discrete items and from bulk
- Sample tracking

- Laboratory Information Systems (LIMS)
- Standard operating procedures (SOP)
- Reproducibility
- Repeatability
- Calculation of measurement uncertainty
- Calculation of confidence intervals from measurement data
- Comparison of values
- Single tail tests
- Two tail tests
- Analysis of variance
- Regression analysis
- Construction of calibration lines
- Construction of relationship lines