TRAINING PROGRAM

Chemical Laboratory Operations, Equipment, Instruments, Quality & Safety

Introduction:

Efficient use of advanced operations and instruments in the chemical laboratory are vital tools to solve any laboratory problem. The course provides basic laboratory analysis methods and troubleshooting techniques for the most used instruments. Laboratory quality management according to an international standard is also important to enhance the laboratory system and environment. In addition, safety regulations are increasingly emphasizing the importance of management commitment and employee involvement in managing risks. The aim of this course is to enrich and advance the skills and knowledge of participants to understand laboratory techniques, quality laboratory requirements and the procedures of safety methods.

Who Should Attend?

The course is designed for chemists, lab technicians, chemical engineers, instrument engineers and lab supervisors/managers.

Methodology:

This interactive Training will be highly interactive, with opportunities to advance your opinions and ideas and will include;

- Lectures
- Workshop & Work Presentation
- Case Studies and Practical Exercise
- Videos and General Discussions

Certificate:

BTS attendance certificate will be issued to all attendees completing minimum of 80% of the total course duration

Course Objectives:

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

- To impart the participants fundamental techniques of chemical laboratory.
- To identify the application of analytical methods.
- To understand the instruments technique.
- To understand the laboratory quality requirements and appreciate the need for a quality system according to the International Standards Organization ISO 17025.
- To understand how to validate the analytical method.
- To use the international Guide to Lab Quality for accreditation standard methods.
- To familiarize participants with the laboratory safety tools.
- To learn standard fire emergency procedures in the laboratory.

Course Outline:

- Introduction to chemical laboratory technique
- Methods of analysis
- Basic laboratory technique: sample preparation, analytical measurement, fundamental concepts, chemical equation, acidity of solution, buffers
- Preparation of chemicals
- Titration methods
- Manipulation methods: solid phase extraction and derivatization
- Chromatography technique
- Gas chromatography (inject system, column, detector types)
- High performance liquid chromatography: mobile phase, pumping system, sample inject system, column, detector types
- Data management software
- Analytical retention process
- Spectroscopy technique and molecule identification
- Spectroscopy - infrared absorption, nuclear magnetic resonance , mass , UV/IR absorption, raman, X-Ray and electron
- Atomic absorption
- Instruments troubleshooting: column contamination, broad in the peak bandwidth, ghost peaks, system peak, contamination in the inlet filter, change solvent in mobile phase (HPLC), interferences in the AAS, detector contamination
- Quantitative methods: calibration methods, external and internal standards, outliers test, determination of analyte concentration, standard addition method, error in quantitative analysis, confidence limits, detection limit, repeatability and reproducibility
- Lab quality management requirements ISO 17025
- Lab quality technical requirements ISO 17025
- Validation of analytical methods
- Laboratory accreditation
- Laboratory standard safety guideline
- Identification of hazardous chemicals
- Safe work practices and procedures
- Management of compressed gases
- Transporting of chemicals

- Electrical safety
- Guidelines for good laboratory practices
- Laboratory fire protection
- Storage and handling of flammable and combustible liquids
- Laboratory waste disposal
- Spill and hazard waste management laboratory first aid