TRAINING PROGRAM

ANALYTICAL CHEMISTRY METHODS AND INSTRUMENTAL TECHNIQUE

Introduction:

Knowledge of modern analytical instruments and techniques is necessary to solve any laboratory problem. The course provides basic analytical analysis methods and troubleshooting techniques of the most used instruments in an analytical laboratory. In addition, it offers elegant tools for qualitative and quantitative data techniques with practice work on analysis software. The aim is to enrich and advance the skills and knowledge of participants to understand analytical chemistry technology.

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 participants fundamental techniques of analytical chemistry.
- To identify the application of analytical methods.
- To understand the instruments' techniques.
- To know how to judge the accuracy and precision of experimental data and how these judgments can be sharpened by the application of statistical methods.
- To understand the tools and techniques used to achieve process analysis, qualitative methods, cause and effect diagrams and calibration graphs.
- To be familiar with the latest analytical methods.

Course Outline:

- Introduction to analytical technique
- Methods of analysis
- Basic laboratory technique: sample preparation, analytical measurement, fundamental concepts, chemical equation, acidity of solution, buffers
- Gravimetric methods of analysis
- Preparation of chemicals
- Acid-base titration methods
- Complex-formation titration methods
- Oxidation-reduction titration
- Precipitation titration methods
- Reference/indicator electrods
- Potentiostatic coulometric
- Potential selectivity of electolytic 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
- Other chromatography techniques
- Data management software
- Analytical retention process
- Spectroscopy technique and molecules identifying
- Infrared absorption spectroscopy
- Nuclear magnetic resonance spectroscopy
- Mass spectroscopy
- UV/IR absorption spectroscopy
- Raman spectroscopy
- X-Ray spectroscopy
- Electron spectroscopy
- 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, reproducibility and method validation.