LIQUID CHROMATOGRAPHY (HPLC) OPERATION, CALIBRATION, TROUBLESHOOTING AND PRACTICE MAINTENANCE

Introduction:

The purpose of this course is to provide advanced training in liquid chromatography techniques and demonstrate their application in practical industry and laboratory problems. The course covers: major components of a liquid chromatography; operating principles; calibration methods; preventative maintenance; troubleshooting methods; quantitative methods; set-up procedures; and failure modes for each, along with practical examples. Preventative maintenance is also covered with an emphasis on analysis and troubleshooting methods. The course also discusses other aspects such as optimization of mobile phase, flows and pressure with the necessary theoretical information in each part. The aim of this course is to enrich and advance the skills and knowledge of the participants and to teach them liquid chromatography operation and techniques.

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 introduce participants to advanced liquid chromatography and how the individual elements interrelate.
- To be able to competently use and develop methods on a liquid chromatograph to produce robust and valid analytical data.
- To provide advance knowledge of HPLC operation and maintenance.
- To provide knowledge of accessories and consumables required for HPLC operation.
- To provide good laboratory practices for accurate and reliable analyses.
- To familiarize participants with the techniques used in liquid chromatography analyses, qualitative and quantitative methods, cause and effect diagrams and standard calibration graph.

Course Outline:

- Fundamentals of chromatography technique
- Theory parameters
- HPLC components
- Mainpulation of analyte
- Solid phase extraction
- Derivatization methods
- Mobile phase solvent
- Pumping system
- Sample injection system
- Column configuration
- Detector types
- Operation method of HPLC
- Overview of liquid chromatographic separation methods
- Partition chromatographic methods
- Ion chromatography
- Size exclusion chromatography
- Application of liquid chromatography
- Chromatography variable effect (band broadening, packed columns efficiency, column impurities, solvent strength and capacity factor, mobile phase and selectivities, change solvent of mobile phase, UV Cut-Off)
- Inject system maintenance
- Column: maintenance, storage, labeling, regeneration, installation
- Pump maintenance check
- Detector preventative maintenance
- Data management software
- Instrument problems and troubleshooting: change in concentration, different results, irreproducible results, unexpected results, contamination, use of solvent near to UV cut off, shift base line in gradient work, increased background noise, presence of system peak, gradient contamination peaks, solvent viscosity, immiscible solvent, formation of salt deposits, unanticipated peaks in reversed phase gradient, retention time shift, degradation of piston seal, sudden increase in column backpressure, loss of efficiency and resolution, column overload, bubbles in detector, detector overload.

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- Quantitative methods: interpolated graph calibration by using external and internal standards, standard addition method, calibration methods, correlation coefficient, outliers test of repeated measurements, outliers in calibration curve, errors in quantitative analysis, distribution of errors, confidence limit, limit of detection, repeatability, reproducibility, optimization methods and method validation.