



TRAINING PROGRAM



ADVANCED GAS CHROMATOGRAPHY (GC) OPERATION, CALIBRATION, TROUBLESHOOTING AND PRACTICE MAINTENANCE

Introduction:

The purpose of this course is to provide advance training in gas chromatography techniques and demonstrate their application to practical industry and laboratory problems. The course covers: major components of a gas 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 discusses many other aspects such as optimization of column lengths, flows and temperatures, 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 gas 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:

- To introduce participants to advanced gas chromatography and how the individual elements interrelate.
- To be able to competently use and develop methods on a gas chromatograph to produce robust and valid analytical data.
- To provide advanced knowledge of gas chromatography operation, maintenance and troubleshooting.
- To impart the participants advance techniques and knowledge of gas chromatography.
- To provide knowledge of accessories and consumables required for gas chromatography operations.
- To provide good laboratory practices for accurate and reliable analyses.
- To train participants to know how to change and install gas chromatography parts such as inject systems and columns.
- To familiarize participants with the techniques used in gas chromatography analysis, qualitative and quantitative methods.

Course Outline:

- Chromatography fundamentals and separation techniques
- Theory parameters
- Operating conditions and standard operating procedures
- Carrier gas and pressure regulator systems
- Sample introduction components
- Split/splitless inlet system
- Cool on-column inlet and programmed temperature vaporization inlet
- Column configuration
- Detector types and configuration
- Software (Star6 and Galaxie Program)
- Retention process
- Manipulation methods
- Standard operation methods
- Successful and safe operating procedures
- Maintenance and installation procedure for inject system, column and detectors
- Approaches to solve gas chromatography problems
- Instrument problems and troubleshooting: band broadening, broaden in initial peak bandwidths, retention gap sampling, sampling by solute focusing, retention gaps tube, baseline deviation, noisy baseline, spikes in baseline, peak shape problems, flat top peaks, split peaks, begative peaks, retention changes, ghost peak, causes and prevention of column damage, column contamination, needle discrimination, change in detectors sensitivity, difficulty in lighting fid flame, loss of detectors linear range, leaks in MS, excessive noise or high background in MS
- Maintenance and installation methods: clean and condition septa, cleaning injector liners, silylating liners, column conditioning, installation fused silica capillary columns, column placement in the oven, column installation, leak detection, bleed test, fid jet cleaning procedure, TCD clean detector cell , cleaning of ECD, FPD maintenance, cleaning MS and change the filament
- 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, Method validation.