

**Training Title**

**ADVANCED CHROMATOGRAPHY TECHNIQUE ANALYSIS & TROUBLESHOOTING**

**Training Duration**

5 days

**Training Venue and Dates**

REF	Advanced Chromatography Technique Analysis &	5	14-18 Oct	\$4,500	Kuwait
LM035	Troubleshooting				

In any of the 5 star hotels. The exact venue will be intimated once finalized.

**Training Fees**

4,500 US\$ per participant for Public Training. Fees includes course materials/handouts, tea/coffee, refreshments, international buffet lunch.

**Training Certificate**

Define Management Consultancy & Training Certificate of course completion will be issued to all attendees.

**TRAINING OVERVIEW**

**INTRODUCTION & DESCRIPTION**

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.

**COURSE OBJECTIVES**

**The Course will enable Participants to:**

- 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.

### Practical Session

- The course includes a practical segment where main components of gas chromatography are demonstrated, i.e.: inject system parts, different liner and syringes, maintenance kits, different column types, FID detectors, and other accessory parts. In addition, the course includes practical exercises on qualitative and quantitative methods using chromatography software, Minitab 15 and Excel.

### Other Information

- Course document is about 225 pages.
- Course presentation power point material is about 300 pages.
- Practical training for each participant will be arranged during the course.
- Exercises and discussions will be conducted at the end of the course.
- Videos of maintenance methods for different components are available throughout the course.
- USB with the course document, power point presentation, video films, articles and exercises will be offered to participants.

### WHO SHOULD ATTEND

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

### TRAINING METHODOLOGY:

A highly interactive combination of lectures and discussion sessions will be managed to maximize the amount and quality of information and knowledge transfer. The sessions will start by raising the most relevant questions, and motivate everybody find the right answers. You will also be encouraged to raise your own questions and to share in the development of the right answers using your own analysis and experiences. Tests of multiple-choice type will be made available on daily basis to examine the effectiveness of delivering the course.

Very useful Course Materials will be given.

- 30% Lectures
- 30% Workshops and work presentation
- 20% Group Work & Practical Exercises
- 20% Videos & General Discussions

### DAILY OUTLINE

Following Topics will be covered in details.

1. Chromatography fundamentals and separation techniques
2. Theory parameters
3. Operating conditions and standard operating procedures
4. Carrier gas and pressure regulator systems
5. Sample introduction components
6. Split/splitless inlet system
7. Cool on-column inlet and programmed temperature vaporization inlet
8. Column configuration
9. Detector types and configuration
10. Software (Star6 and Galaxie Program)
11. Retention process
12. Manipulation methods
13. Standard operation methods
14. Successful and safe operating procedures
15. Maintenance and installation procedure for inject system, column and detectors
16. Approaches to solve gas chromatography problems
17. 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
18. 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
19. 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
20. Method validation

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Case Studies, Discussions, Role Plays, Discussions & Last review will be carried out

### TRAINING OUTCOME

- ✓ 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.

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- ✓ To impart the participants advance techniques and knowledge of gas chromatography.
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