



# AL081: Advanced Gas Chromatography Techniques & Troubleshooting

### Training Description:

The purpose of this intensive 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.

### Training Objective:

By the end of the training, participants will be able to:

- ✓ Introduce to advanced gas chromatography and how the individual elements interrelate
- ✓ Competently use and develop methods on a gas chromatograph to produce robust and valid analytical data
- ✓ Provide advanced knowledge of gas chromatography operation, maintenance and troubleshooting
- ✓ Impart the participants advance techniques and knowledge of gas chromatography
- ✓ Provide knowledge of accessories and consumables required for gas chromatography operations
- ✓ Provide good laboratory practices for accurate and reliable analyses
- ✓ Train participants to know how to change and install gas chromatography parts such as inject systems and columns
- ✓ Familiarize with the techniques used in gas chromatography analysis, qualitative and quantitative methods

### Training Designed for:

This course is intended for Chemists, Lab Technicians, Chemical Engineers, Instrument Engineers and Lab Supervisors/Managers.

### Training Program:

#### DAY ONE:

- ❖ PRE-TEST
- ❖ Gas Chromatography Introduction
- ❖ Chromatography Fundamental and Separation Technique
- ❖ Theory Parameters
- ❖ Operating Condition and Standard Operating Procedure

#### DAY TWO:

- ❖ Carrier Gas and Pressure Regulator System
- ❖ Sample Introduction Components
- ❖ Split/Splitless Inlet System
- ❖ Cool On-Column Inlet and Programmed Temperature Vaporization Inlet

### DAY THREE:

- ❖ Column Configuration
- ❖ Detector Types and Configuration
- ❖ Software (Star6 and Galaxie Program)
- ❖ Retention Process, Manipulation Methods

### DAY FOUR:

- ❖ Standard Operation Method
- ❖ Successful and Safe Operating Procedure
- ❖ Maintenance and Installation Procedure for Inject System, Column and Detectors
- ❖ **Practical Session**

### DAY FIVE:

- ❖ Approaches to Solve GC 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, Negative 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
- ❖ Course Conclusion
- ❖ POST-TEST and EVALUATION

## Training Requirements:

“Hands-on practical sessions, equipment and software will be applied during the course if required and as per the client’s request.”

Please note that the above topics can be amended as per client’s learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

## Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Software & General Discussions
- Pre and Post Test



### Training Certificate(s):

Internationally recognized certificate(s) will be issued to each participant who completed the course.

### Training Fees:

**As per the course location** - This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01<sup>st</sup> of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

### Training Timings:

#### Daily Timings:

07:45 - 08:00	Morning Coffee / Tea
08:00 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:30	Recess (Prayer Break & Lunch)
13:30 - 15:00	Last Session

**For training registrations or in-house enquiries, please contact:**

**Aisha Relativo:** [aisha@cmc-me.com](mailto:aisha@cmc-me.com)

Tel.: +971 2 665 3945 or +971 2 643 6653 | Mob.: +971 52 2954615

Training & Career Development Department