GAS CHROMATOGRAPHY TECHNIQUES & TROUBLESHOOTING

TRAINIT ACADEMY

CLE142
Chemical Laboratory Engineering, Technology & Management

COURSE TITLE

GAS CHROMATOGRAPHY TECHNIQUES & TROUBLESHOOTING

COURSE DATE/ VENUE

15-19 August 2022

Madrid, Spain

COURSE REFERENCE

CLE142

COURSE DURATION

05 Days

DISCIPLINE

Chemical Laboratory Engineering, Technology & Management

COURSE INTRODUCTION

The course covers the major components and subsystems of a gas chromatography and its accessories, including inject system, columns, detectors and data system. It presents operating principles, calibration methods, set-up procedures, and failure modes for each along with practical examples. Preventative maintenance is covered with emphasis on maintaining analysis and troubleshooting methods. The course discusses optimization of column lengths, flows, and temperatures and includes the necessary theoretical information in each part. This course is designed for the new or experienced GC practitioner who wishes to increase instrument uptime and laboratory productivity.

The course includes also the practical maintenance where the important parts of GC are demonstrated i.e. inject system part, different liner and syringes, maintenance kit, different columns type, FID detector, and other accessory parts which is variable used.

COURSE OBJECTIVE

Upon successful completion of this course, the delegates will be able to:

- ✓ Discuss about the optimal use of Gas chromatography (GC).
- ✓ Discuss on the applications, maintenance and troubleshooting.
- ✓ Describe the GC maintenance methods as a routine checks.
- ✓ Recognize accessories and consumables required for GC operation.
- ✓ Perform good laboratory practices for accurate, reliable and get it right-first analysis.
- ✓ Explain the applications of analysis and method development.
- ✓ Describe advance techniques for achieving gas chromatography analysis, qualitative and quantitative methods, cause and effect diagrams and standard calibration graph.

COURSE AUDIENCE

All technicians, chemists, chemical engineers, instrument engineers, supervisors and managers who work in any laboratory field i.e. medical, biological, oil, environment, water, etc.

COURSE CONTENT

Fundamental and Theory

Introduction

Modern Chromatography Methods

Overview of GC System Components

Theory Parameters

Gas Chromatography Components

Carrier Gas and Pressure Regulator System

Carrier Gas Selection

Regulator Selection

Gas Purity Filters

Sample Introduction Components

Split Inlet System

Splitless Inlet System
Cool On-Column Inlet
Programmed Temperature Vaporization Inlet
Column Configuration
Detector Types and Configuration

Retention Process
Stationary Phase for Capillary Column
Stationary Phase for Packed Column
Stationary Phase Interaction

Manipulation Methods
Solid Phase Extraction Method
Derivatization Method
Derivatization for Detector
Standard Operation Method
Operating Procedure
Successful and Safe Operate
Refinery Gas Analysis Technique
PCB-Oil Sample Analysis Technique
Biological Analysis Technique

Maintenance and Installation Procedures
Inject System
Column
Detector

Instrumental Problems and Troubleshooting
Approaches To Solve GC Problems
Band Broadening
Baseline Deviation

Peak Shape Problems

Flat Top Peaks

Split Peaks

Negative Peaks

Excessively Broad Solvent Front

Loss of Resolution

Retention Changes

Peak Size Problems

Extra or Ghost Peaks (Carryover)

Common Problems with FID

Common Problems with ECD

Common Problems with TCD

Common Problems with FPD

Common Problems with MS

Causes and Prevention of Column Damage

Column Contamination

Common Problems with Injectors

Needle Discrimination

Measurements Deviation

Overlapping Peaks

Calibration Methods and Data Troubleshooting

Calibration and Quantitative Methods

Errors in Classical Analysis

Detection Limit

Confidence Limits

Outliers Test

Experimental Design and Optimization

COURSE CERTIFICATE

TRAINIT ACADEMY will award an internationally recognized certificate(s) for each delegate on completion of training.

COURSE FEES

$6,150 per Delegate. This rate includes participant's manual, Hand-Outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

COURSE METHODOLOGY

The training course will be highly participatory and the course leader will present, guide and facilitate learning, using a range of methods including formal presentation, discussions, sector-specific case studies and exercises. Above all, the course leader will make extensive use of real-life case examples in which he has been personally involved. 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.

- 30% Lectures
- 30% Workshops and work presentation
- 20% Case studies & Practical Exercises
- 10% Role Play
- 10% Videos, Software or Simulators (as applicable) & General Discussions