



Oil, Gas and Chemical

## Gas Chromatography and Troubleshooting for the Oil & Gas Industry

## Course Introduction

---

Gas Chromatography has become an important analytical tool in virtually every phase of the petroleum industry, from exploration of crude oil and refining of finished products to research on new petrochemicals. Gas Chromatography (GC) is one of the most widely used techniques in modern analytical chemistry and in its basic form, is used to separate complex mixtures of different molecules based on their physical properties, such as polarity and boiling point. It is an ideal tool to analyze gas and liquid samples containing many hundreds or even thousands of different molecules, as in the case of crude oil or its products. The technique allows the analyst to identify both the types of molecular species present and their concentrations.

This comprehensive BOOST Oil & Gas Technology training seminar introduces the fundamental theory of Gas Chromatography along with the operation, maintenance and troubleshooting, from sample introduction through to data analysis. Instrument components are described and presented, along with their underlying theories as they apply to guiding best practices and effective method optimization and troubleshooting.

## Target Audience

---

- Process design
- Unit Operator
- Environmental
- Process safety engineer
- Gasoline blender engineer
- Lab supervisor
- Supply chain engineer
- Distillates analyst
- Models engineer
- Chemical Operator
- Chemical Plant Operator

- Chemical Process Technician
- Control Room Supervisor
- Gas Plant Process Operator
- Gas Production Operator
- Gas Terminal Operations and Storage
- Gathering Pipeline engineer
- Oil Terminal / Storage engineer
- Pipeline Maintenance / Equipment / Compliance / Repair
- Pipeline Testing / Technician / Supervisor / Safety
- Plant Equipment Operator
- Plant Operations Technician
- Plant Shutdown
- Plant Supervisor
- Power Distribution
- Power Plant Manager
- Process Supervisor
- Refinery Operations Technician / Manager
- Terminal Operator / Manager
- Utilities Operator

## Learning Objectives

---

- Understand the Basic Theoretical Aspects of Gas Chromatography
- Communicate practical information, capabilities and limitations of Gas Chromatography
- Gain confidence on the:
  1. GC Analysis Technique
  2. GC Troubleshooting
  3. Analytical Results Evaluation

# Course Outline

---

- **01 Day One**

- Introduction to Chromatography**

- Overview of Gas Chromatography
    - Gas Chromatography Theory
      1. The Development Process
      2. Factors Controlling Retention
      3. Molecular Forces and Chromatographic Selectivity
      4. Stationary Phase Loading and GC Performance
    - Chromatography Nomenclature

- **02 Day Two**

- Injection Ports**

- **Gas Supply and Handling**
    - **GC Inlets Selection Variation**
      1. Capillary vs. Packed Column
      2. Direct Capillary
      3. Split / Split Less
      4. Programmed Temperature Vaporizer (PTV) Inlets
      5. Cool on Column
    - The Role of Sample Introduction and Injection Ports in GC Operations
    - Sample Introduction – Auto Samplers

- **03 Day Three**

- Gas Chromatography (GC) Columns**

- Column Selection
      1. Packed
      2. Capillary
    - GC Column impact on Performance
    - Peak Dispersion in a Chromatographic Column
    - Column Maintenance and Troubleshooting
    - GC Oven

- Isothermal vs. Temperature Programming
- **04 Day Four**

### **Gas Chromatography (GC) Detectors**

- GC Detector Selection
  - Detector Role in GC Operations
  - How detectors can impact GC performance?
  - Detector Maintenance and Troubleshooting
  - Chromatography Applications
  - Method Development
  - Setup and GC Operation
  - Preparation for Operation
- **05 Day Five**

### **Gas Chromatography (GC) Data Acquisition and Processing**

- Sampling Techniques
- Data Acquisition and Processing Systems
- Calibration and GC Performance
- Gas Chromatography Troubleshooting
- Laboratory Information Management System (LIMS)
- ISO17025 Accreditation Basics
- Laboratory Management & Troubleshooting

## **Confirmed Sessions**

FROM	TO	DURATION	FEES	LOCATION
April 7, 2025	April 11, 2025	5 days	4250.00 \$	UAE - Dubai
July 21, 2025	July 25, 2025	5 days	4950.00 \$	Spain - Madrid
Oct. 13, 2025	Oct. 17, 2025	5 days	4250.00 \$	UAE - Dubai

FROM	TO	DURATION	FEES	LOCATION
Jan. 27, 2025	Jan. 31, 2025	5 days	4250.00 \$	UAE - Abu Dhabi