



# AL120: Chemical Laboratory Operations, Equipment, Instruments, Quality & Safety

## Training Description:

Efficient use of advanced operations and instruments in the chemical laboratory are vital tools to solve any laboratory problem. The course provides basic laboratory analysis methods and troubleshooting techniques for the most used instruments. Laboratory quality management according to an international standard is also important to enhance the laboratory system and environment. In addition, safety regulations are increasingly emphasizing the importance of management commitment and employee involvement in managing risks. The aim of this course is to enrich and advance the skills and knowledge of participants to understand laboratory techniques, quality laboratory requirements and the procedures of safety methods.

## Training Objectives:

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

- ✓ Impart the participants fundamental techniques of chemical laboratory
- ✓ Identify the application of analytical methods
- ✓ Understand the instruments technique
- ✓ Understand the laboratory quality requirements and appreciate the need for a quality system according to the International Standards Organization ISO 17025
- ✓ Understand how to validate the analytical method
- ✓ Use the international Guide to Lab Quality for accreditation standard methods
- ✓ Familiarize participants with the laboratory safety tools
- ✓ Learn standard fire emergency procedures in the laboratory

## Training Designed for:

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

## Training Requirement:

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

Contents can be adapted to your specific wishes. It is therefore possible to focus on specific modules of the training course as per client’s learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

## Training Program:

### DAY ONE:

- ❖ Introduction to chemical laboratory technique
- ❖ Methods of analysis
- ❖ Basic laboratory technique: sample preparation, analytical measurement, fundamental concepts, chemical equation, acidity of solution, buffers
- ❖ Preparation of chemicals
- ❖ Titration methods
- ❖ Manipulation methods: solid phase extraction and derivatization

#### DAY TWO:

- ❖ Chromatography technique
- ❖ Gas chromatography (inject system, column, detector types)
- ❖ High performance liquid chromatography: mobile phase, pumping system, sample inject system, column, detector types
- ❖ Data management software
- ❖ Analytical retention process
- ❖ Spectroscopy technique and molecule identification
- ❖ Spectroscopy – infrared absorption, nuclear magnetic resonance, mass, UV/IR absorption, raman, x-ray and electron

#### DAY THREE:

- ❖ Atomic absorption
- ❖ Instruments troubleshooting: column contamination, broad in the peak bandwidth, ghost peaks, system peak, contamination in the inlet filter, change solvent in mobile phase (HPLC), interferences in the AAS, detector contamination
- ❖ Quantitative methods: calibration methods, external and internal standards, outliers test, determination of analyte concentration, standard addition method, error in quantitative analysis, confidence limits, detection limit, repeatability and reproducibility
- ❖ Lab quality management requirements ISO 17025
- ❖ Lab quality technical requirements ISO 17025
- ❖ Validation of analytical methods

#### DAY FOUR:

- ❖ Laboratory accreditation
- ❖ Laboratory standard safety guideline
- ❖ Identification of hazardous chemicals
- ❖ Safe work practices and procedures
- ❖ Management of compressed gases
- ❖ Transporting of chemicals

#### DAY FIVE:

- ❖ Electrical safety
- ❖ Guidelines for good laboratory practices
- ❖ Laboratory fire protection
- ❖ Storage and handling of flammable and combustible liquids
- ❖ Laboratory waste disposal
- ❖ Spill and hazard waste management laboratory first aid
- ❖ Course Conclusion
- ❖ POST-ASSESSMENT and EVALUATION

### Training Certificate(s):

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

## 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, Gamification, Software & General Discussions
- Pre and Post Test

## Training Fees:

**TBA 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 01st 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:**

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Training & Career Development Department