

**Training Title**

**ANALYTICAL INSTRUMENTATION SYSTEM**

**Training Duration**

5 days

**Training Venue and Dates**

REF	Analytical Instrument				
IC022	System	5	06-10 May	\$4,250	Abu Dhabi, UAE

In any of the 5 star hotel. Exact venue will be informed upon confirmation.

**Training Fees**

- 4,250 US\$ per participant includes Training Materials/Handouts, Tea/Coffee breaks, Refreshments and International Buffet Lunch.

**Training Certificate**

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

**COURSE DESCRIPTION**

Instrumental methods of analysis became the methods of choice in modern laboratories. Sensitivity, selectivity, multi-analyte analysis and processing large number of samples in short time contribute to this progress. Instrumental methods are usually associated with employment of small amounts of samples and minimum use of toxic reagents. This course deals with the principles and applications of modern analytical instruments. Emphasis is placed upon the theoretical basis of each type of instrument, its optimal area of application, its sensitivity, its precision, and its limitations. Electroanalytical, spectroscopic and chromatographic methods will be covered in detail. Statistical treatment of analytical data and validation of analytical method will be emphasized.

**COURSE OBJECTIVES**

1. To introduce the student to philosophy behind instrumental methods.
2. To teach the student the principles of popular instrumental methods.
3. To teach the student statistical methods and validation of analytical results.
4. To teach the student the complementary aspects of various instrumental methods.
5. Handling of real samples related to industrial, environmental and biomedical analysis.
6. How to purchase an instrument of analysis or how to get the best of it.

**WHO SHOULD ATTEND**

All scientists and engineers involved in chemical analysis and working in analytical laboratories.

**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

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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

### **COURSE OUTLINE**

#### **Introduction to Instrumental Methods**

- Philosophy behind instrumental methods.
- Survey of instrumental methods.
- The analytical process.

#### **Statistical Evaluation of Analytical Data and Validation of Analytical Method**

- Accuracy, precision, confidence intervals.
- Validation of analytical results.
- Linearity and least squares method.
- Internal standard and standard addition methods.
- Validation of analytical methods.
- Development of standard operation procedures (SOPs)

#### **Electroanalytical Methods**

- Introduction to electrochemical methods
- Potentiometric methods
- Voltammetric methods

#### **Spectroscopic Methods**

- Introduction to spectroscopic methods.
- Ultraviolet and Visible Absorption Spectroscopy
- Molecular Fluorescence and Phosphorescence.
- Atomic Absorption Spectroscopy.
- Atomic Emission Spectroscopy.
- Mass Spectrometry

#### **Chromatographic Separations**

- Fractionation processes.
- Operational aspects of chromatographic separations.
- Gas Chromatography.
- High Performance Liquid Chromatography.

**Sample Preparation for Instrumental Analysis**

- Sample preparation for elemental analysis.
- Sample preparation for analysis by gas chromatography.
- Sample preparation for analysis by liquid chromatography.

**Case Studies Discussions, Last Day Review and Assessments will be carried out**

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