



Oil, Gas and Chemical

Inductively Coupled Plasma Mass Spectrometry (ICP-MS) Basic User Level

Course Introduction

This course provides an introduction to the principles and applications of Inductively Coupled Plasma Mass Spectrometry (ICP-MS). Participants will learn about the operation of ICP-MS instruments, sample preparation techniques, and data analysis methods. The training is designed for beginners who are new to ICP-MS and seeks to equip them with the foundational skills needed to operate the equipment effectively and interpret results.

Target Audience

- Laboratory technicians and analysts
- Environmental scientists
- Quality control professionals
- Students and researchers in analytical chemistry

Learning Objectives

- Understand the fundamental principles of ICP-MS and its components.
- Prepare samples and operate the ICP-MS instrument safely and effectively.
- Analyze and interpret data obtained from ICP-MS.
- Recognize common challenges and troubleshooting techniques in ICP-MS analysis.

Course Outline

• 01 Day One

Introduction to ICP-MS and Instrumentation

Session 1: Fundamentals of Mass Spectrometry

- Basic principles of mass spectrometry.
- Overview of the mass spectrometer components.

Session 2: Introduction to Inductively Coupled Plasma (ICP)

- Principles of plasma generation and characteristics.
- Advantages of ICP as an ion source.

Session 3: Overview of ICP-MS Instrumentation

- Key components of an ICP-MS system: nebulizer, plasma torch, and mass analyser.
- Discussion of different types of ICP-MS configurations (quadrupole, time-of-flight).

Session 4: Sample Preparation Techniques

- Importance of sample preparation for ICP-MS analysis.
- Overview of sample digestion, dilution, and stabilization methods.

Session 5: Safety and Operational Procedures

- Laboratory safety protocols when using ICP-MS.
- Best practices for instrument operation and maintenance

• 02 Day Two

Operating ICP-MS and Data Acquisition

Session 1: Setting Up the ICP-MS

- Step-by-step guide on instrument setup and calibration.
- Understanding the role of internal standards and calibration curves.

Session 2: Sample Introduction and Analysis

- Techniques for introducing samples into the ICP-MS.

- Understanding the impact of sample matrix on analysis.

Session 3: Data Acquisition and Instrument Control

- Overview of data acquisition software and interfaces.
- Monitoring instrument performance and stability.

Session 4: Basic Troubleshooting and Maintenance

- Common issues encountered in ICP-MS operation and how to address them.
- Routine maintenance procedures to ensure optimal performance.

Session 5: Hands-On Practice

- Participants will operate the ICP-MS instrument.
- Sample analysis and data acquisition exercises.

• 03 Day Three

Data Interpretation and Applications

Session 1: Data Analysis and Interpretation

- Techniques for processing and interpreting ICP-MS data.
- Understanding results and reporting formats.

Session 2: Quality Control in ICP-MS

- Importance of quality control measures in ICP-MS analysis.
- Implementing quality assurance protocols and procedures.

Session 3: Applications of ICP-MS

- Overview of applications in environmental, pharmaceutical, and materials analysis.
- Case studies demonstrating the versatility of ICP-MS.

Session 4: Advanced Topics in ICP-MS

- Introduction to isotopic analysis and mass spectrometry advancements.
- Discussion on emerging trends and technologies in ICP-MS.

Session 5: Final Assessment and Course Wrap-Up

- Assessment of participants' understanding through a quiz or group discussion.
- Discussion on the future applications of ICP-MS and participant feedback.

Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
May 25, 2025	May 27, 2025	3 days	4250.00 \$	KSA - Riyadh
Sept. 8, 2025	Sept. 10, 2025	3 days	4250.00 \$	UAE - Dubai
Nov. 24, 2025	Nov. 26, 2025	3 days	4950.00 \$	Netherlands - Amsterdam
June 6, 2025	June 8, 2025	3 days	4250.00 \$	UAE - Abu Dhabi