

Atomic Absorption Spectrometry Laboratory Practice Course

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Overview

Atomic Absorption Spectrometry Laboratory Practice Course is a one-week course for laboratory analysts, chemists, quality-control specialists and environmental testing personnel who leave with an AAS Method Control File. Participants apply flame and graphite-furnace workflows to sample preparation, calibration, interference control, quality assurance, maintenance, troubleshooting and defensible reporting across environmental and process laboratories. The course separates element-specific absorbance practice from plasma emission methods. Agile Leaders Training Center develops practical atomic absorption laboratory capability.

Who Should Attend

- Laboratory teams responsible for elemental analysis and result release
- Quality teams responsible for calibration controls and analytical records
- Environmental testing teams responsible for water, waste and soil extracts
- Process laboratory teams responsible for raw-material and product checks
- Technical support teams responsible for instrument availability and fault isolation

The course assumes participants already perform routine wet-chemistry work and leaves out ICP-OES method development and advanced research instrumentation.

Departments and Industries

The course supports laboratory and quality functions working with elemental measurements in several sectors.

- Environmental monitoring and water treatment laboratories
- Oil, gas and petrochemical process laboratories
- Mining, metals and materials testing departments
- Food, pharmaceutical and consumer-product quality laboratories
- Maintenance and technical assurance teams supporting analytical instruments

Learning Objectives

By the end of this course, participants will be able to:

- Compare flame and graphite-furnace AAS method capabilities
- Apply sample preparation and contamination-control practices
- Build calibration and quality-control sequences
- Analyze chemical, spectral and background interference evidence
- Diagnose sensitivity, drift and precision faults
- Evaluate results and assemble defensible analytical records

Course Agenda

Day 1: AAS Measurement Foundations

- Beer-Lambert Absorbance Model and Element-Specific Line Sources
- Hollow-Cathode Lamp Selection and Optical Alignment Checks
- Flame AAS and Graphite-Furnace AAS Decision Matrix
- EPA Method 7000B and Method 7010 Scope Mapping
- AAS Method Control File Structure and Data-Quality Objectives

Day 2: Samples, Standards and Calibration

- Sample Preservation, Digestion and Dilution Decision Tree
- Volumetric Standard Preparation and Traceability Record
- Blank, Calibration Standard and Continuing Check Sequence
- Calibration Curve Review and Working-Range Evaluation
- Contamination Control and Laboratory Reagent-Water Checklist

Day 3: Atomization and Interference Control

- Burner, Nebulizer and Spray-Chamber Optimization Method
- Graphite-Furnace Temperature Program Development
- Background Correction and Nonspecific Absorption Assessment
- Chemical, Ionization and Spectral Interference Diagnosis Matrix
- Matrix Modification and Standard-Addition Selection Rules

Day 4: Quality Assurance and Troubleshooting

- Method Blank, Spike, Duplicate and Control-Sample Plan
- Detection Limit and Quantitation Limit Evaluation Workflow
- Control Chart Review and Out-of-Control Response Rules
- Sensitivity, Drift and Precision Fault-Finding Tree
- Preventive Maintenance Log and Corrective-Action Record

Day 5: Laboratory Practice and Capstone

- Exercise: Select FAAS or GFAAS for a Matrix-and-Level Scenario
- Exercise: Build a Calibration and Quality-Control Batch
- Exercise: Diagnose Interference and Instrument-Fault Evidence
- Exercise: Review Results Against Acceptance Criteria
- Capstone Exercise: Complete an AAS Method Control File

Practical Exercises

The course uses suggested activities that connect method decisions with laboratory evidence.

- Suggested activity: map a water and process-sample workflow from receipt through reporting
- Suggested activity: prepare a calibration sequence with blanks, checks, spikes and duplicates
- Suggested activity: investigate poor sensitivity using maintenance and interference evidence
- Suggested activity: assemble an AAS Method Control File for technical review

FAQs

Who suits the Atomic Absorption Spectrometry Laboratory Practice Course?

Laboratory analysts, chemists and quality personnel suit the course when they already perform routine laboratory calculations and safe wet-chemistry tasks.

How does atomic absorption spectrometry differ from ICP-OES training?

Atomic absorption spectrometry uses element-specific absorption measurements and flame or furnace atomization, while ICP-OES training centers on plasma emission and multielement optical systems.

Does atomic absorption training cover both flame and graphite-furnace methods?

Yes. The course compares method selection, operating controls, sensitivity, interferences and quality practices for flame and graphite-furnace AAS.

How does atomic absorption quality control support defensible results?

Atomic absorption quality control links blanks, calibration checks, spikes, duplicates and control samples to documented acceptance decisions and corrective actions.

What atomic absorption troubleshooting skills are practiced?

Participants practice diagnosing sensitivity loss, drift, poor precision, contamination, background effects, matrix interference and component-related faults.

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Conclusion

Participants complete an AAS Method Control File that links method choice, preparation, calibration, quality controls and troubleshooting evidence. The file supports consistent batch review and clearer corrective-action decisions. Participants can adapt its templates to environmental, process and product-testing matrices under their laboratory procedures.

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