AMERICAN GLOBAL INSTITUTE FOR PRIVATE TRAINING

External Training Course

Petroleum Laboratory Masterclass: Skills & Standards

From 19 Oct. To 23 Oct. 2025
From 23 Nov. To 27 Nov. 2025
From 14 Dec. To 18 Dec. 2025

InterContinental Cairo Semiramis by IHG Hotel, Cairo, Egypt

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Course Overview

This professional course is designed for laboratory technicians, engineers, and quality assurance professionals in the petroleum industry. It equips participants with essential skills for petroleum testing, laboratory operations, and quality assurance. Participants will gain practical knowledge in testing fuels, lubricants, and petrochemical products, interpreting results, and applying international standards (ASTM, ISO, API) effectively. The course emphasizes accuracy, safety, compliance, and operational efficiency.

Course Objectives

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

- Perform essential petroleum laboratory testing techniques confidently.
- Conduct accurate physical and chemical analysis of fuels and lubricants.
- Apply international standards (ASTM, ISO, API) for quality assurance.
- Ensure laboratory safety and compliance with environmental regulations.
- Identify, analyze, and solve common laboratory problems.
- Develop clear, professional laboratory reports and documentation.
- Optimize laboratory workflow and efficiency.
- Understand modern laboratory equipment, tools, and emerging technologies.
- Integrate lab results into operational and strategic decision-making.
- Enhance professional competency for career growth in petroleum labs.

Target Audience

Laboratory technicians, engineers, and supervisors in petroleum companies.
Quality control and assurance specialists.
Refinery and petrochemical laboratory staff.
R&D personnel in fuel and lubricant testing.
Professionals involved in petrochemical, fuel, or lubricant analysis.

Training Methodology

Interactive lectures and concept discussions.
Hands-on laboratory demonstrations and exercises.
Group problem-solving and case studies.
Step-by-step guidance for laboratory procedures.
Practical application of quality standards.
Data interpretation and result analysis workshops.
Simulation of real-life lab scenarios for decision-making.
Benchmarking against industry standards.

Organizational Impact

Improved reliability and accuracy of laboratory testing.
Streamlined laboratory workflows and operations.
Better compliance with international quality and safety standards.
Enhanced credibility of laboratory results for stakeholders.
Reduced operational risks and errors.
Stronger internal quality assurance practices.
Support for operational and strategic decision-making through accurate lab data.

Personal Impact

Increased practical laboratory skills and confidence.
Improved analytical thinking and problem-solving capabilities.
Ability to mentor and guide junior lab staff.
Professional growth and enhanced career opportunities.
Exposure to modern petroleum laboratory techniques and best practices.
Strengthened understanding of industry standards and compliance.

Course Content and Agenda

Day 1 – Introduction & Laboratory Fundamentals

- Overview of petroleum laboratory operations and functions.
- Laboratory safety protocols and compliance essentials.
- Personal protective equipment (PPE) and safe handling practices.
- Introduction to fuel and lubricant testing techniques.
- Laboratory equipment overview: purpose, use, and maintenance.
- Sample collection, storage, and preservation methods.
- Calibration procedures for accurate measurements.
- Documentation, record-keeping, and reporting practices.
- Common laboratory errors and corrective actions.
- Group discussion: best practices in lab operations.

Day 2 – Fuel Testing & Analysis

- Physical properties testing: density, viscosity, pour point, flash point, cloud point.
- Chemical composition analysis: sulfur content, octane/cetane number, additives.
- Contamination detection and water content analysis.
- Fuel performance and compatibility testing.
- Sample preparation techniques for various fuels.
- Interpretation of ASTM and ISO test results.
- Hands-on exercises: performing fuel tests.
- Troubleshooting typical fuel testing challenges.
- Data recording, reporting, and presentation techniques.
- Group exercises: analyzing and comparing fuel samples.

Day 3 – Lubricant & Petrochemical Product Testing

- Types of lubricants and their properties.
- Viscosity index measurement and temperature behavior.
- Additives and degradation analysis.
- Oxidation, wear, and contamination testing.
- Testing polymer-modified and synthetic lubricants.
- Spectroscopic and chromatographic techniques.
- Practical demonstration of lubricant tests.
- Troubleshooting lubricant testing issues.
- Reporting results and providing operational recommendations.
- Group discussion: improving lubricant analysis processes.

Day 4 – Quality Assurance & Laboratory Management

- Fundamentals of laboratory quality management systems.
- ISO 17025 and international accreditation requirements.
- Internal audits and quality control procedures.
- Data integrity, traceability, and validation.
- Risk assessment and mitigation strategies.
- Statistical quality control and process monitoring basics.
- Benchmarking laboratory results against standards.
- Hands-on QA exercises and case studies.
- Corrective and preventive actions (CAPA) in lab operations.
- Group discussion: improving lab workflow efficiency.

Day 5 – Practical Applications & Emerging Techniques

- Comprehensive practical exercises on fuel and lubricant testing.
- Laboratory workflow optimization and time management.
- Troubleshooting real-life laboratory challenges.
- Interpretation of results for operational decision-making.
- Reporting, documentation, and presentation of lab findings.
- Introduction to emerging petroleum lab technologies and automation.
- Case studies: problem-solving in practical lab scenarios.
- Final practical assessment and evaluation.
- Key takeaways and action plan for professional application.
- Certification guidance and course wrap-up.

Program Agenda:

(1st Day) Agenda

8.30	9.00	Opening Remarks (30 Min.).
9.00	11.30	Discuss Major Course Points: • Introduction & Laboratory Fundamentals. • Fuel Testing & Analysis. • Lubricant & Petrochemical Product Testing. • Quality Assurance & Laboratory Management. • Practical Applications & Emerging Techniques.
11.30	12.00	Coffee Break
12.00	14.00	Introduction & Laboratory Fundamentals: • Overview of petroleum laboratory operations and functions. • Laboratory safety protocols and compliance essentials. • Personal protective equipment (PPE) and safe handling practices. • Introduction to fuel and lubricant testing techniques. • Laboratory equipment overview: purpose, use, and maintenance. • Sample collection, storage, and preservation methods. • Calibration procedures for accurate measurements. • Documentation, record-keeping, and reporting practices. • Common laboratory errors and corrective actions. • Group discussion: best practices in lab operations.
14.00	14.30	Questions and Discussion
14.30		Buffet Lunch

(2nd Day) Agenda

9.00	11.30	Fuel Testing & Analysis: • Physical properties testing: density, viscosity, pour point, flash point, cloud point. • Chemical composition analysis: sulfur content, octane/cetane number, additives. • Contamination detection and water content analysis. • Fuel performance and compatibility testing. • Sample preparation techniques for various fuels.
11.30	12.00	Coffee Break
12.00	14.00	Fuel Testing & Analysis: • Interpretation of ASTM and ISO test results. • Hands-on exercises: performing fuel tests. • Troubleshooting typical fuel testing challenges. • Data recording, reporting, and presentation techniques. • Group exercises: analyzing and comparing fuel samples.
14.00	14.30	Questions and Discussion
14.30		Buffet Lunch

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(3rd Day) Agenda

9.00	11.30	Lubricant & Petrochemical Product Testing: • Types of lubricants and their properties. • Viscosity index measurement and temperature behavior. • Additives and degradation analysis. • Oxidation, wear, and contamination testing. • Testing polymer-modified and synthetic lubricants. • Spectroscopic and chromatographic techniques.
11.30	12.00	Coffee Break
12.00	14.00	Lubricant & Petrochemical Product Testing: • Practical demonstration of lubricant tests. • Troubleshooting lubricant testing issues. • Reporting results and providing operational recommendations. • Group discussion: improving lubricant analysis processes.
14.00	14.30	Questions and Discussion
14.30		Buffet Lunch

(4th Day) Agenda

9.00	11.30	Quality Assurance & Laboratory Management: • Fundamentals of laboratory quality management systems. • ISO 17025 and international accreditation requirements. • Internal audits and quality control procedures. • Data integrity, traceability, and validation. • Risk assessment and mitigation strategies. • Statistical quality control and process monitoring basics.
11.30	12.00	Coffee Break
12.00	14.00	Quality Assurance & Laboratory Management: • Benchmarking laboratory results against standards. • Hands-on QA exercises and case studies. • Corrective and preventive actions (CAPA) in lab operations. • Group discussion: improving lab workflow efficiency.
14.00	14.30	Questions and Discussion
14.30		Buffet Lunch

(5th Day) Agenda

9.00	11.30	Practical Applications & Emerging Techniques: • Comprehensive practical exercises on fuel and lubricant testing. • Laboratory workflow optimization and time management. • Troubleshooting real-life laboratory challenges. • Interpretation of results for operational decision-making. • Reporting, documentation, and presentation of lab findings. • Introduction to emerging petroleum lab technologies and automation.
11.30	12.00	Coffee Break
12.00	14.00	Practical Applications & Emerging Techniques: • Case studies: problem-solving in practical lab scenarios. • Final practical assessment and evaluation. • Key takeaways and action plan for professional application. • Certification guidance and course wrap-up.
14.00	14.30	Questions, Discussion & Conclusion Training Course.
14.30		Buffet Lunch