COURSE OVERVIEW LE1010
Laboratory Analyses for Oil & Gas Production

Course Title
Laboratory Analyses for Oil & Gas Production

Course Date/Venue
November 02-06, 2025/Tamra Meeting Room, Al Bandar Rotana Creek, Dubai UAE

Course Reference
LE1010

Course Duration/Credits
Five days/3.0 CEUs/30 PDHs

Course Description

This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.

This course is designed to provide participants with a detailed and up-to-date overview of Laboratory Analyses for Oil & Gas Production. It covers the sample collection and handling; the basic analytical equipment for oil & gas labs; the analytical techniques, hydrocarbon analysis, water quality testing in oil & gas and acidity and alkalinity testing; the sulfur content analysis, elemental analysis, gas chromatography for volatile compounds and viscosity and density measurement; the corrosion and scale analysis, advanced chromatography techniques and mass spectrometry for oil & gas; and the fourier transform infrared (FTIR) spectroscopy, rheological properties of fluids, bioanalytical methods in oil & gas and environmental and safety considerations in laboratory analysis.

During this interactive course, participants will learn the laboratory role in drilling operations, production chemistry and scaling control; the reservoir fluids and well testing, well stimulation and laboratory support; the production water treatment laboratory, quality assurance and control in production laboratories; the data interpretation and analysis, troubleshooting laboratory equipment and reporting and documentation standards; troubleshooting common production issues; the laboratory auditing and compliance; and the future trends and innovations in laboratory analysis.

Course Objectives

Upon the successful completion of this course, each participant will be able to:-

- Apply and gain an in-depth knowledge on laboratory analyses for oil & gas production
- Carryout sample collection and handling and discuss the basic analytical equipment for oil & gas labs
- Employ analytical techniques, hydrocarbon analysis, water quality testing in oil & gas and acidity and alkalinity testing
- Apply sulfur content analysis, elemental analysis, gas chromatography for volatile compounds and viscosity and density measurement
- Illustrate corrosion and scale analysis, advanced chromatography techniques and mass spectrometry for oil & gas
- Discuss fourier transform infrared (FTIR) spectroscopy, rheological properties of fluids, bioanalytical methods in oil & gas and environmental and safety considerations in laboratory analysis
- Identify laboratory role in drilling operations and apply production chemistry and scaling control including reservoir fluids and well testing
- Apply well stimulation and laboratory support, production water treatment laboratory and quality assurance and control in production laboratories
- Employ data interpretation and analysis, troubleshooting laboratory equipment and reporting and documentation standards
- Troubleshoot common production issues, apply laboratory auditing and compliance and discuss future trends and innovations in laboratory analysis

Exclusive Smart Training Kit - H-STK®

*Participants of this course will receive the exclusive "Haward Smart Training Kit" (**H-STK®**). The **H-STK®** consists of a comprehensive set of technical content which includes **electronic version** of the course materials conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides an overview of all significant aspects and considerations of on laboratory analyses for oil & gas production for laboratory technicians & analysts, production engineers, process engineers, reservoir engineers, quality control/quality assurance (QC/QA) staff, petroleum engineers, health, safety, and environment (HSE) personnel, chemical engineers, field supervisors / operators, R&D personnel and oilfield services company staff.

Course Fee

US$ 5,500 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

Certificate Accreditations

Haward's certificates are accredited by the following international accreditation organizations:

- British Accreditation Council (BAC)

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

- The International Accreditors for Continuing Education and Training (IACET - USA)

  Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

  Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

  Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:

Mr. **Nikolas Karnavos**, MSc, BSc, is a **Senior Analytical Chemist** with over **30 years** of extensive experience within the **Oil**, **Gas**, **Refinery** and **Petrochemical** industries. His expertise widely covers **Gas & Liquid Chromatograph Process Analysers**, **Process Analyzer Techniques** (**Online** & **Offline**), Laboratory Information Management System (**LIMS**), **Data & Method Validation in Analytical Laboratories**, Laboratory **Automation Techniques**, **Practical Problem Solving in Chemical Analysis**, **Practical Statistical Analysis of Lab Data**, **Chemical Laboratory**, **Analytical Laboratory & Instrumentation**, Laboratory **Health & Safety**, **GLP**, Laboratory **Quality Management** (**ISO 17025**), **ISO 9001** and Medical Laboratory Quality Management (**ISO 15189**). Further, he is also well-versed in Environmental **Online Analyzers** (**Air** & **Water**), **Gas Chromatography** and various instrumental methods of analysis such as **Water Analysis & Quality Control**, **Water and Wastewater Chemical** Analysis, **Statistical Data and Laboratory Analysis**, **Gas** Analysis, **Qualitative Fuel** Analysis, **Environmental Chemical** Analysis, **Laboratory Environmental** Analysis including Water Quality Testing, Process Water and **Wastewater Effluents**, Oily **Sludge Treatment**, Atomic Absorption and Spectroscopic Methods in Analytical Chemistry, **Analytical Method Development** and **Methods of Environmental Measurements** (**Water**, **Air**, **Liquid** & **Solid Wastes**).

Mr. Karnavos was the **Laboratory Manager** of **Exxon** wherein he was responsible for **ISO 17025 certification**, upgrading laboratory equipment in **refinery**, **petrochemical** and **polypropylene** plants, upgrading and extending LIMS, handling the transition plan process of the existing laboratory to a new as well as formulating and executing the plans for applied research and technology transfer. During his career life, he had occupied several significant positions as the **Laboratory Analyst**, **Laboratory Professor**, **Quality Manager**, **Partner & Managing Director**, **Environmental Engineer**, **Process Engineer**, **Environmental Management Corporate Department Head** and **Quality Control & Plastics Application Head** with different international companies like the **AQUACHEM**, **Hellenic Petroleum** (**EXXON**) and **Technological Institute**.

Mr. Karnavos holds a **Master** degree in **Chemical Engineering** and **Bachelor** degrees in **Mechanical Engineering** and **Petroleum Engineering** from the **Aristotelian University of Thessaloniki**, **Technological Institute** and **KATEE Kavala** respectively. He is an **Accredited Trainer** for the Organization for the Certifications & Vocational Guidance (**EOPPEP**), a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**), a **Certified Instructor/Trainer** and an **Accredited Environmental Auditor** from the **IEMA**. Further, he is the **President** of Greek **Association of Chemical Engineers** and an active member of various professional engineering bodies internationally like the **IEMA**, **Technical Chamber** of Greece and the **CONCAWE**. He also **published numerous books** and **scientific papers** and delivered various trainings and workshops worldwide.

Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

30% Lectures
20% Practical Workshops & Work Presentations
30% Hands-on Practical Exercises & Case Studies
20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: Sunday, 02nd of November 2025

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Overview of Laboratory Analyses in Oil & Gas Production*** *Role of Laboratories in Production Processes • Key Laboratory Analyses for Oil and Gas • Importance of Accuracy and Precision • Regulatory Standards and Compliance*
0930 – 0945	*Break*
0945 – 1030	***Sample Collection & Handling*** *Sampling Techniques for Oil, Gas, and Water • Preserving Sample Integrity • Chain of Custody and Documentation • Common Challenges in Sample Collection*
1030 – 1130	***Basic Analytical Equipment for Oil & Gas Labs*** *Common Laboratory Instruments Used in Oil & Gas • Calibration and Maintenance Procedures • Troubleshooting Basic Lab Equipment • Safety Protocols for Lab Equipment*
1130 – 1230	***Overview of Analytical Techniques*** *Spectroscopy Methods (UV, IR, etc.) • Chromatography (GC, HPLC) • Gravimetric Analysis • Titration and Electrochemical Methods*
1230 – 1245	*Break*
1245 – 1330	***Hydrocarbon Analysis*** *Techniques for Analyzing Crude Oil and Natural Gas • Basic Composition Analysis (C1–C5 and Higher Hydrocarbons) • Distillation Processes • Sample Preparation for Hydrocarbon Testing*
1330 – 1420	***Water Quality Testing in Oil & Gas*** *Importance of Water Quality in Production • Common Water Contaminants (Salts, Minerals, etc.) • Water Sampling and Preservation • Analytical Techniques for Water Analysis*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day One*

Day 2: Tuesday, 03rd of November 2025

0730 – 0830	***Acidity & Alkalinity Testing*** *Importance of pH in Oil and Gas Production • Methods for Measuring pH • Acid-Base Titrations • Impact of pH on Corrosion and Scaling*
0830 – 0930	***Sulfur Content Analysis*** *Measuring Sulfur in Crude Oil and Gas • Methods: X-ray Fluorescence (XRF), ASTM D4294 • Implications for Refining and Processing • Environmental Concerns of Sulfur Emissions*
0930 – 0945	*Break*
0945 – 1045	***Elemental Analysis: Metals & Trace Elements*** *Detection of Metals in Oil and Gas Products • Techniques: Atomic Absorption Spectroscopy (AAS), ICP-OES • Common Elements: Nickel, Vanadium, and Mercury • Impact of Trace Metals on Equipment and Processing*
1045 – 1200	***Gas Chromatography for Volatile Compounds*** *Principles of Gas Chromatography • Sample Preparation for GC Analysis • Identifying and Quantifying Volatile Organic Compounds • Applications in Oil & Gas Quality Control*
1200 – 1215	*Break*
1215 – 1330	***Viscosity & Density Measurement*** *Significance of Viscosity in Oil Production • Methods for Measuring Viscosity (e.g., ASTM D445) • Density Measurements and Their Applications • Effect of Temperature on Viscosity and Density*
1330 – 1420	***Corrosion & Scale Analysis*** *Identifying and Analyzing Corrosion Products • Methods for Scale Detection (e.g., X-ray Diffraction) • Impact of Corrosion and Scale on Production • Chemical Inhibitors Used in Production Processes*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Two*

Day 3: Wednesday, 04th of November 2025

0730 – 0830	***Advanced Chromatography Techniques*** *High-Performance Liquid Chromatography (HPLC) • Supercritical Fluid Chromatography (SFC) • Comparison with Gas Chromatography • Applications in Oil & Gas Production*
0830 – 0930	***Mass Spectrometry for Oil & Gas*** *Principles of Mass Spectrometry • Coupling MS with Chromatography (GC-MS, LC-MS) • Quantitative and Qualitative Analysis • Advanced Applications in Contaminant Detection*
0930 - 0945	*Break*
0945 – 1130	***Fourier Transform Infrared (FTIR) Spectroscopy*** *Working Principle of FTIR • FTIR in Analyzing Crude Oil and Gas • Identifying Functional Groups in Hydrocarbons • Applications in Quality Control and Research*
1130 - 1230	***Rheological Properties of Fluids*** *Measuring the Flow Characteristics of Oil and Gas • Instruments for Rheological Testing • Importance of Rheology in Transportation • Impact of Temperature and Pressure on Fluid Behavior*
1230 - 1245	*Break*
1245 - 1330	***Bioanalytical Methods in Oil & Gas*** *Use of Bioassays for Detecting Contamination • Microbiological Growth in*

	Production Systems • Biodegradation of Hydrocarbons • Monitoring and Controlling Microbial Activity
1330 - 1420	***Environmental & Safety Considerations in Laboratory Analysis*** *Health, Safety, and Environmental Regulations • Laboratory Waste Disposal and Chemical Handling • Safety Standards for Lab Personnel • Managing Environmental Risks in Oil & Gas Production*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Three*

Day 4: Thursday, 05th of November 2025

0730 – 0830	***Laboratory Role in Drilling Operations*** *Supporting Drilling Fluid Analysis • Monitoring Cuttings and Mud Properties • Laboratory Analysis of Drilling Fluids • Importance of Real-Time Data in Drilling Operations*
0830 – 0930	***Production Chemistry & Scaling Control*** *Laboratory Analysis of Scaling Potential • Techniques for Identifying Scale-Forming Compounds • Chemical Treatments to Control Scaling • Impact of Scale on Production Efficiency*
0930 - 0945	*Break*
0945 – 1130	***Reservoir Fluids & Well Testing*** *Analyzing Fluids from Production Wells • Techniques for Well Testing and Fluid Sampling • Reservoir Fluid Characterization Methods • Laboratory Support for Reservoir Management*
1130 - 1230	***Well Stimulation & Laboratory Support*** *Laboratory Analysis of Fracturing Fluids • Monitoring Additives and Proppants • Analysis of Gel Strength and Viscosity • Laboratory Tests for Well Stimulation Optimization*
1230 - 1245	*Break*
1245 - 1330	***Production Water Treatment Laboratory*** *Laboratory Analysis for Water Treatment • Identifying Contaminants in Produced Water • Chemical Treatment for Water Disposal • Laboratory's Role in Monitoring Treatment Efficacy*
1330 - 1420	***Quality Assurance & Control in Production Laboratories*** *Establishing QA/QC Protocols for Lab Analyses • Methods for Ensuring Accuracy in Results • Validating Analytical Methods • Continuous Improvement Practices in the Lab*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Four*

Day 5: Friday, 06th of November 2025

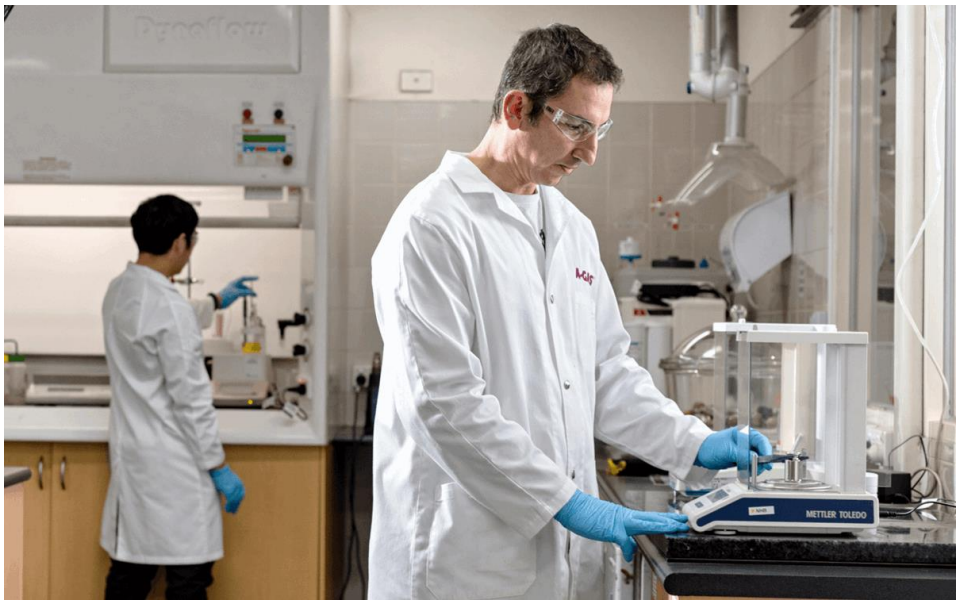
0730 – 0830	***Data Interpretation & Analysis*** *Interpreting Laboratory Results • Statistical Analysis of Test Data • Data Correlation and Trends • Reporting Results to Operations Teams*
0830 – 0930	***Troubleshooting Laboratory Equipment***

	Identifying Common Lab Equipment Issues • Basic Troubleshooting Techniques • Calibration and Recalibration Procedures • Preventive Maintenance of Analytical Equipment
0930 - 0945	*Break*
0945 – 1030	***Reporting & Documentation Standards*** *Best Practices in Reporting Laboratory Findings • Standards for Lab Report Formatting • Importance of Traceability and Documentation • Compliance with Industry Standards (e.g., ISO)*
1030 – 1115	***Troubleshooting Common Production Issues*** *Identifying Production Problems through Laboratory Data • Troubleshooting Scaling, Corrosion, and Sediment Issues • Solving Water Contamination Issues • Corrective Actions Based on Lab Analysis*

1115 - 1200	***Laboratory Auditing & Compliance*** *Auditing Laboratory Processes for Compliance • Internal and External Audits • Regulatory Requirements for Oil & Gas Labs • Maintaining ISO Certification for Laboratories*
1200 - 1215	*Break*
1215 – 1345	***Future Trends & Innovations in Laboratory Analysis*** *Emerging Technologies in Oil & Gas Laboratory Analyses • Digitalization and Automation in Lab Operations • Future Research Areas in Oil & Gas Laboratory Testing • Advancements in Remote Sensing and Monitoring Technologies*
1345 – 1400	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course*
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Practical Sessions

This practical and highly-interactive course includes real-life case studies and exercises:-



Course Coordinator

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