

**COURSE OVERVIEW DE0319**  
**Petroleum Systems & Exploration & Development Geochemistry**

**Course Title**

Petroleum Systems & Exploration & Development Geochemistry

**Course Date/Venue**

Session 1: July 14-18, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Session 2: December 21-25, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE



**Course Reference**

DE0319



**Course Duration/Credits**

Five days/3.0 CEUs/30 PDHs

**Course Description**



***This practical and highly-interactive course includes real-life case studies where participants will be engaged in a series of interactive small groups and class workshops.***



This course is designed to provide participants with a detailed and up-to-date overview of petroleum systems and exploration and development geochemistry. It covers the dynamic petroleum system concept; evaluating source rocks; the exploration geochemistry; the preservation and destruction of accumulations; the reservoir geochemistry; and the gas and oil fingerprinting, production allocation.



During this interactive course, participants will learn how geochemistry can reduce the risk associated with petroleum exploration, how to predict oil quality from inexpensive wellbore measurements, how to identify reservoir compartments and de-convolute commingled petroleum, and how to assess completion problems.

This course provides interpretive guidelines for sample collection and project initiation, how to evaluate prospective source rocks, and how to define petroleum systems through oil-oil and oil-source rock correlation. Case studies and exercises illustrate how geochemistry can be used to solve exploration, production, and development problems while minimizing cost. Further, the course is designed to improve basic understanding of the processes that control petroleum quality in reservoir rocks and the bulk, molecular, and isotopic tools that facilitate that understanding.

### **Course Objectives**

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

- Apply and gain a comprehensive knowledge on petroleum systems and exploration and development geochemistry
- Recognize the dynamic petroleum system concept covering petroleum system folio sheet, timing of petroleum system events and processes, basin and petroleum system models, origin and preservation of sedimentary organic matter
- Evaluate source rocks covering vitrinite reflectance, thermal maturity, calibration, kinetics, TOC, rock-eval pyrolysis, geochemical logs, fractional conversion, original TOC, expelled petroleum and expulsion efficiency
- Discuss exploration geochemistry including gas chromatography, stable isotopes, surface geochemical exploration, semivariograms and spatial significance of data, biomarker separation and analysis, source- and age-related parameters, oil-oil and oil-source rock correlation
- Determine preservation and destruction of accumulations and discuss thermal maturity parameters, biodegradation parameters, ancillary geochemical tools, chemometrics for correlation and mixture analysis
- Explain reservoir geochemistry covering migration and compartments, migration mechanisms: diffusion, solution, gas-phase, oil-phase, sample collection/water chemistry, gravity segregation, biodegradation/water washing, phase changes: deasphalting, wax crystallization, retrograde condensation, evaporative fractionation, thermal maturation, TSR and reactive polar precipitation
- Perform gas and oil fingerprinting and production allocation and discuss gas chromatography, stable isotopes, reservoir compartments, leaky casing, production allocation, hydrocarbon and non-hydrocarbon gases, gas shale and other unconventional

### **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 during the course conveniently saved in a **Tablet PC**.*

### Who Should Attend


This course provides an overview of all significant aspects and considerations of petroleum systems and exploration and development geochemistry for geoscientists, exploration, production and development geologists.

### 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

Certificates are accredited by the following international accreditation organizations: -

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British Accreditation Council (BAC)

Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. 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.

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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. Shehab Al-Hamoud, MSc, BSc, is a Senior Petroleum Engineer with over 25 years of offshore and onshore experience in the Oil & Gas, Refinery & Petrochemical industries. His wide expertise includes Advanced Production Logging, Well Testing & Software Application, Wellhead & X-mass Tree, Completion Design, Well Integrity, Drilling & Workover Operations, Completion Design & Fishing, Well Control, Stuck Pipe Principle & Practical, Advanced Coiled Tubing Operations & Fishing, Rigless Solutions, Advanced Wire Line & Fishing, Well Completion Design & Performance for Production Engineering, SCSSV Problems, Well Testing Operations, Well Intervention (IWCFR), Workovers & Completions, Petroleum Risk & Decision Analysis, Well Testing Analysis, Engineering & Simulation, Reservoir Monitoring, Artificial Lift Design, Gas Operations, Oil & Gas Production, Well Cementing, Production Optimization, Production Logging and Project Evaluation & Economic Analysis. He is currently the Well Service & Field Operations Engineer/Supervisor wherein he is in-charge of rigless package operations, kill well, coiled tubing operations, acidizing and fracturing, slick line operations, well completion and exploratory well testing operations, safety and emergency exercises on site.**

During his career life, Mr. Shehab has gained his practical and field experience through his various significant positions and dedication as the **Field Operations Engineer, Well Services Engineer, Completion & Well Service Supervisor, Rigless Package Supervisor, Completion & Workover Supervisor, Completion & Workover Supervisor, Well Site Supervisor and Senior Technical Train/Lecturer** from various international companies such as the AFPC, ADCO and SPC just to name a few.

Mr. Shehab has a **Bachelor’s degree in Petroleum Engineering**. Further, he is a **Certified Instructor/Trainer a Certified Petroleum Engineer**, held certificates on **IADC/ IWCF Well Control and H2S Training** and has delivered numerous trainings, courses, seminars, workshops and conferences internationally.

**Course Fee**

**US\$ 8,000** 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.

**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**

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	<b>PRE-TEST</b>
0830 – 0930	<b>The Dynamic Petroleum System Concept</b> Objectives, Terms, Nomenclature • Petroleum System Folio Sheet: Map and Cross Section at Critical Moment, Table of Accumulations, Event Chart, Burial History Chart • Timing of Petroleum System Events and Processes
0930 – 0945	Break
0945 – 1030	<b>The Dynamic Petroleum System Concept (cont'd)</b> Introduction to Basin and Petroleum System Models • Origin and Preservation of Sedimentary Organic Matter • Project Initiation and Sample Collection, Exercises
1030 - 1215	<b>Evaluating Source Rocks</b> Vitrinite Reflectance: Thermal Maturity, Calibration, Kinetics • TOC, Rock-Eval Pyrolysis, Geochemical Logs
1215 – 1230	Break
1230 – 1420	<b>Evaluating Source Rocks (cont'd)</b> Fractional Conversion, Original TOC, Expelled Petroleum, Expulsion Efficiency • Interpretive Pitfalls; Exercises
1420 – 1430	<b>Recap</b>
1430	Lunch & End of Day One

**Day 2**

0730 – 0900	<b>Exploration Geochemistry</b> Gas Chromatography, Stable Isotopes, Surface Geochemical Exploration • Semivariograms and Spatial Significance of Data
0900 – 0915	Break
0945 - 1100	<b>Exploration Geochemistry (cont'd)</b> Biomarker Separation and Analysis
1100 - 1215	<b>Exploration Geochemistry (cont'd)</b> Source- and Age-Related Parameters, Introduction to Oil-Oil and Oil-Source Rock Correlation

1215 - 1230	Break
1230 - 1320	<b>Exploration Geochemistry (cont'd)</b> Source- and Age-Related Parameters, Introduction to Oil-Oil and Oil-Source Rock Correlation
1320 - 1420	<b>Exploration Geochemistry (cont'd)</b> Interpretive Pitfalls; Exercises
1420 - 1430	<b>Recap</b>
1600	Lunch & End of Day Two

**Day 3**

0730 - 0930	<b>Preservation &amp; Destruction of Accumulations</b> Thermal Maturity Parameters; Cracking, Thermochemical Sulfate Reduction • Biodegradation Parameters
0930 - 0945	Break
0945 - 1100	<b>Preservation &amp; Destruction of Accumulations (cont'd)</b> Ancillary Geochemical Tools; Semi-Volatile Aromatics, Light Hydrocarbons, Mud Gas Isotope Logging, Fluid Inclusion Volatiles, Diamondoids
1100 - 1230	<b>Preservation &amp; Destruction of Accumulations (cont'd)</b> Chemometrics for Correlation, Mixture Analysis
1230 - 1245	Break
1245 - 1320	<b>Preservation &amp; Destruction of Accumulations (cont'd)</b> Interpretive Pitfalls; Exercises
1320 - 1420	<b>Preservation &amp; Destruction of Accumulations (cont'd)</b> Exploration Geochemistry Case Studies
1420 - 1430	<b>Recap</b>
1430	Lunch & End of Day Three

**Day 4**

0730 - 0930	<b>Reservoir Geochemistry</b> Objectives, Terms, Nomenclature • Migration and Compartments • Migration Mechanisms: Diffusion, Solution, Gas-Phase, Oil-Phase
0930 - 0945	Break
0945 - 1200	<b>Reservoir Geochemistry (cont'd)</b> Sample Collection/Water Chemistry • Gravity Segregation, Biodegradation/Water Washing
1200 - 1215	Break
1215 - 1320	<b>Reservoir Geochemistry (cont'd)</b> Phase Changes: Deasphalting, Wax Crystallization, Retrograde Condensation, Evaporative Fractionation • Thermal Maturation, TSR, Reactive Polar Precipitation
1320 - 1420	<b>Reservoir Geochemistry (cont'd)</b> Interpretive Pitfalls; Exercises
1420 - 1430	<b>Recap</b>
1600	Lunch & End of Day Four

**Day 5**

073- 0930	<b>Gas &amp; Oil Fingerprinting, Production Allocation</b> Gas Chromatography, Stable Isotopes • Oil Fingerprinting: Reservoir Compartments
0930 - 0945	Break
0945 - 1200	<b>Gas &amp; Oil Fingerprinting, Production Allocation (cont'd)</b> Leaky Casing, Production Allocation • Interpretive Pitfalls; Exercises

1200 - 1215	<i>Break</i>
1215 - 1300	<b><i>Gas &amp; Oil Fingerprinting, Production Allocation (cont'd)</i></b> <i>Hydrocarbon and Non-Hydrocarbon Gases • Gas Shale and Other Unconventionals</i>
1300 - 1345	<b><i>Gas &amp; Oil Fingerprinting, Production Allocation (cont'd)</i></b> <i>Reservoir Geochemistry Case Studies</i>
1345 - 1400	<b><i>Course Conclusion</i></b>
1400 - 1415	<b><i>POST-TEST</i></b>
1415 - 1430	<i>Presentation of Course Certificates</i>
1430	<i>Lunch &amp; End of Course</i>

**Practical Session**

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



**Course Coordinator**

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