COURSE OVERVIEW DE0586
Integrating Petrophysical, Geomechanics & Seismic Measurements

Course Title
Integrating Petrophysical, Geomechanics & Seismic Measurements

Course Date/Venue
January 05-09, 2026/TBA Meeting Room,
The H Hotel, Sheikh Zayed Road, Dubai, UAE

Course Reference
DE0586

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

Course Description

This practical and highly-interactive workshop 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 Integrating Petrophysical, Geomechanics & Seismic Measurements. It covers the reservoir characterization, petrophysical basics, geomechanics fundamentals and seismic data fundamentals; the well logging and core integration and advanced log interpretation techniques; the shaly sand, carbonate petrophysics, fluid saturation and contacts; the petrophysical uncertainty analysis, rock physics models for seismic integration, in-situ stress analysis from logs and rock strength and elastic property prediction; the wellbore stability modeling, fracture characterization and stimulation and geomechanical application in reservoir management; the seismic attribute analysis and seismic inversion techniques; and the AVO and rock physics templates and seismic–geomechanics coupling.

During this interactive course, participants will learn the 3D structural and stratigraphic modeling; the integrated reservoir model and field development optimization; the risk and uncertainty management covering scenario-based sensitivity analysis, value of information assessment and tiered decision-making frameworks; the digital and AI-assisted integration tools comprising of machine learning in well log prediction; and the seismic facies classification using deep learning, real-time geomechanics monitoring and digital twin applications for reservoir modelling.

Course Objectives

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

- Apply and gain an in-depth knowledge on integrating petrophysical, geomechanics and seismic measurements
- Discuss the reservoir characterization, petrophysical basics, geomechanics fundamentals and seismic data fundamentals
- Carryout well logging and core integration and advanced log interpretation techniques as well as discuss shaly sand, carbonate petrophysics and fluid saturation and contacts
- Carryout petrophysical uncertainty analysis, rock physics models for seismic integration, in-situ stress analysis from logs and rock strength and elastic property prediction
- Illustrate wellbore stability modeling, fracture characterization and stimulation and geomechanical application in reservoir management
- Employ seismic attribute analysis and seismic inversion techniques and identify AVO and rock physics templates and seismic–geomechanics coupling
- Illustrate 3D structural and stratigraphic modeling, building the integrated reservoir model and field development optimization
- Apply risk and uncertainty management covering scenario-based sensitivity analysis, value of information assessment and tiered decision-making frameworks
- Identify digital and AI-assisted integration tools comprising of machine learning in well log prediction, seismic facies classification using deep learning, real-time geomechanics monitoring and digital twin applications for reservoir modelling

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 integrating petrophysical, geomechanics and seismic measurements for petrophysicists and geophysicists, geologists and reservoir engineers, geomechanical engineers and rock physicists, seismic interpretation and processing specialists, formation evaluation and well logging engineers and those who involved in reservoir characterization, field development, and subsurface data integration.

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:

Ms. Diana Helmy, PgDip, MSc, BSc, is a **Senior Petroleum & Geologist** with extensive years of experience within the **Oil & Gas**, **Refinery** and **Petrochemical** industries. Her expertise widely covers in the areas of **Petrophysical, Geomechanics & Seismic Measurements, Log Interpretation** Techniques, **Petrophysical Uncertainty** Analysis, **Wellbore Stability Modeling, Seismic Attribute Analysis, Seismic Geomechanics Coupling, Tubular & Pipe** Handling, **Tubular Strength**, **Casing & Tubing** Design, **Production/Injection Loads** for Casing Strings & Tubing, **Drilling** Loads, **Drilling & Production Thermal** Loads, **Well** Architecture, **Wellhead Integrity**, **Well Integrity & Artificial Lift**, **Well Integrity** Management, **Well** Completion & Workover, Applied **Drilling** Practices, Horizontal **Drilling**, **Petroleum** Production, **Resource & Reserve Evaluation**, **Reserves Estimation & Uncertainty**, Methods for **Aggregation of Reserves & Resources**, **Horizontal & Multilateral Wells**, **Well Completion & Stimulation**, **Artificial Lift System Selection & Design**, **Well** Testing & Oil Well Performance, **Well** Test Design Analysis, **Well Test** Operations, **Well Testing & Perforation**, **Directional** Drilling, **Formation Damage** Evaluation & Preventive, **Formation Damage** Remediation, **Drilling & Formation Damage**, Simulation Program for The **International Petroleum Business**, **Well** Testing & Analysis, **Horizontal & Multilateral Wells & Reservoir** Concerns, **Oil & Gas Analytics**, **Petrophysics & Reservoir Engineering**, **Subsurface GeologFy & Logging** Interpretation, **Petroleum Geology**, **Geophysics**, **Seismic** Processing & Exploration, **Seismic** Interpretation, **Sedimentology**, **Stratigraphy & Biostratigraphy**, **Petroleum Economy**, **Core** Analysis, Well Logging Interpretation, **Core Lab Analysis** & **SCAL**, **Sedimentary Rocks**, **Rock** Types, Core & Ditch Cuttings Analysis, Clastic, Carbonate & Basement Rocks, **Stratigraphic Sequences**, **Petrographically** Analysis, Thin Section Analysis, Scanning Electron Microscope (**SEM**), X-ray Diffraction (**XRD**), Cross-Section Tomography (**CT**), **Conventional & Unconventional** Analysis, **Porosity & Permeability**, **Geological & Geophysical** Model, **Sedimentary** Facies, **Formation Damage** Studies & Analysis, **Rig** Awareness, 2D&3D **Seismic** Data Processing, Static & Dynamic Correction, Noise Attenuation & Multiple Elimination Techniques, Velocity Analysis & Modeling and various software such as Petrel, OMEGA, LINUX, Kingdom and Vista. She is currently a **Senior Consultant** wherein she is responsible in different facets of **Petroleum & Process Engineering** from managing **asset integrity**, **well integrity process**, **pre-commissioning/commissioning** and **start up** onshore & offshore process facilities.

During her career life, Ms. Diana worked as a **Reservoir Geologist**, **Seismic Engineer**, **Geology Instructor**, **Geoscience Instructor & Consultant** and **Petroleum Geology Researcher** from various international companies like the **Schlumberger**, Corex Services for Petroleum Services, Petrolia Energy Supplies and Alexandria University.

Ms. Diana has a **Postgraduate Diploma** in **Geophysics**, **Master's** degree in **Petroleum Geology** and **Geophysics** and a **Bachelor's** degree in **Geology**. Further, she is a **Certified Trainer/Assessor/Internal Verifier** by the **Institute of Leadership & Management** (**ILM**) and has delivered numerous trainings, courses, workshops, seminars and conferences internationally.

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 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.

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: ***Monday, 05th of January 2026***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Introduction to Reservoir Characterization*** *Importance of Multi-Disciplinary Integration • Reservoir Heterogeneity and Complexity • Workflow Steps from Data Acquisition to Modeling • Different Characterization Scales (Core, Well, Field, Basin)*
0930 – 0945	*Break*
0945 – 1030	***Petrophysical Basics Review*** *Porosity and Permeability Fundamentals • Archie's Equation and Saturation Models • Log-Derived versus Core-Derived Properties • Reservoir Quality Indicators (RQI, FZI)*
1030 – 1130	***Geomechanics Fundamentals*** *In-Situ Stresses and Stress Tensors • Elastic Rock Properties (Young's Modulus, Poisson's Ratio) • Rock Strength and Failure Criteria (Mohr-Coulomb, Hoek-Brown) • Role of Geomechanics in Drilling and Completion Design*
1130 – 1230	***Seismic Data Fundamentals*** *Wave Propagation Principles • Seismic Acquisition and Processing Basics • Reflection and Refraction Concepts • Time-Depth Relationships*
1230 - 1245	*Break*
1245 - 1330	***Well Logging & Core Integration*** *Core Recovery, Handling, and Preservation • Lithofacies and Petrographic Descriptions • Wireline Logging Interpretation Workflow • Calibration Between Logs and Core Data*

1330 - 1420	***Overview of Integration Objectives*** *Linking Rock Physics to Seismic Responses • Establishing Petrophysical–Geomechanical Relationships • Generating Elastic and Acoustic Models • Delivering Integrated Reservoir Models*
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, 06th of January 2026***

0730 – 0845	***Advanced Log Interpretation Techniques*** *NMR Logging Applications • Resistivity Anisotropy Interpretation • Dipole Sonic Logs for Geomechanics • Multi-Mineral and Structural Modeling*
0845 – 0930	***Shaly Sand & Carbonate Petrophysics*** *Clay Volume Estimation Methods • Dual Porosity in Carbonates • Vugs versus Interparticle Porosity Differentiation • Permeability Prediction Models*
0930 – 0945	*Break*
0945 – 1100	***Fluid Saturation & Contacts*** *Transition Zone Behavior • Capillary Pressure Curves and J-Function • Hydrocarbon-Water Contact Identification • Relative Permeability Curves Integration*
1100 - 1230	***Petrophysical Uncertainty Analysis*** *Sources of Measurement and Interpretation Variation • Sensitivity Analysis • Probabilistic versus Deterministic Interpretation • Data Validation Workflows*
1230 – 1245	*Break*
1245 – 1330	***Rock Physics Models for Seismic Integration*** *Gassmann Fluid Substitution • Hertz-Mindlin Contact Theory • Velocity-Porosity Relationships • Elastic Property Cross-Plot Interpretation*
1330 - 1420	***Case Study Workshops (Hands-On)*** *Real Well Log Interpretation • Data QC and Normalization Exercise • Multi-Well Property Comparison • Reporting and Visualization Techniques*
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, 07th of January 2026***

0730 – 0845	***In-Situ Stress Analysis from Logs*** *Minimum and Maximum Horizontal Stress Estimation • Sonic Log and Density Log Stress Indicators • Borehole Breakout and Tensile Fracture Recognition • Shale versus Sandstone Geomechanical Contrast*
0845 – 0930	***Rock Strength & Elastic Property Prediction*** *Dynamic versus Static Modulus Correlations • UCS Prediction from Sonic Logs • Shear Modulus and Compressive–Tensile Strength Mapping • Geomechanical Property Upscaling*
0930 – 0945	*Break*
0945 – 1100	***Wellbore Stability Modeling*** *Causes of Wellbore Collapse and Fracturing • Drilling Mud Weight Window Optimization • Using Geomechanical Models in Real-Time Drilling • Practical Examples of Stable Well Design*

1100 - 1230	***Fracture Characterization & Stimulation*** *Natural Fracture Detection from Image Logs • Fracture Orientation and Permeability Impact • Hydraulic Fracture Modeling Parameters • Frac-Hit and Interference Analysis*
1230 – 1245	*Break*
1245 – 1330	***Geomechanical Application in Reservoir Management*** *Sand Production Prediction and Management • Compaction Drive Reservoirs • Fault Reactivation and Induced Seismicity • Safe Depletion Planning*
1330 - 1420	***Practical Group Exercise*** *Generate a 1D Geomechanical Model • Interpret Breakouts from Logs • Select Safe Operating Envelopes • Document Geomechanical Workflow Results*
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*

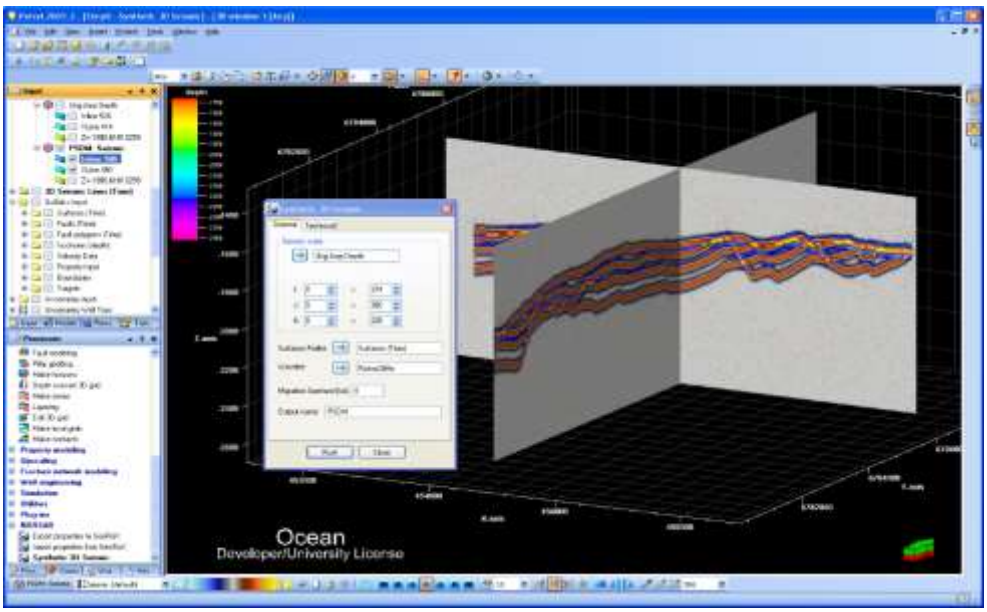
Day 4: ***Thursday, 08th of January 2026***

0730 – 0845	***Seismic Attribute Analysis*** *RMS Amplitude and Impedance Contrasts • Spectral Decomposition for Stratigraphic Interpretation • Coherence and Curvature Attributes • Lithofacies and Fluid Indicators*
0845 – 0930	***Seismic Inversion Techniques*** *Post-Stack versus Pre-Stack Inversion • Acoustic Impedance Inversion Workflows • Simultaneous Inversion Inputs and Constraints • Cross-Plotting Inverted Properties with Logs*
0930 – 0945	*Break*
0945 – 1100	***AVO & Rock Physics Templates*** *AVO Classification (Class I–IV) • Reflection Coefficient Modeling • Fluid and Lithology Differentiation • Rock Physics Template Plotting and Interpretation*
1100 - 1230	***Seismic–Geomechanics Coupling*** *Using Seismic Velocities for Stress Estimation • Mapping Stress Variations Across the Field • Detecting Sweet Spots for Drilling and Stimulation • Integrating Seismic Anisotropy into Models*
1230 – 1245	*Break*
1245 – 1330	***3D Structural & Stratigraphic Modeling*** *Fault and Horizon Interpretation Workflow • Modeling Reservoirs with Seismic Constraints • Sealing versus Non-Sealing Fault Evaluation • Integration into Static Geomodels*
1330 - 1420	***Workshop: Seismic–Petrophysical Tie*** *Wavelet Extraction Exercise • Synthetic Seismogram Generation • Log to Seismic Correlation • Validate Seismic-Based Reservoir Property Predictions*
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*

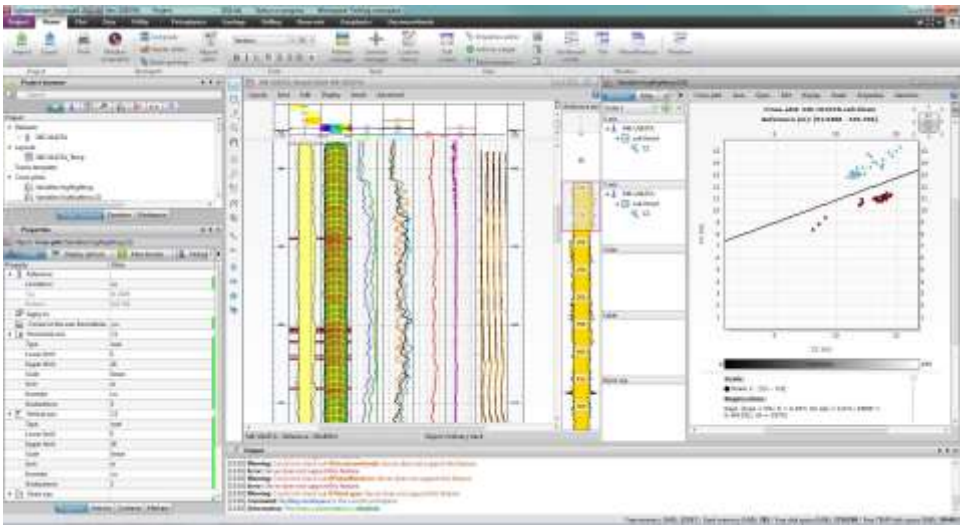
Day 5:	***Friday, 09th of January 2026***
0730 – 0845	***Building the Integrated Reservoir Model*** *Data Organization and QC • Gridding and Upscaling Methods • Merging Petrophysics, Geomechanics and Seismic • Model Uncertainty Assessment*
0845 – 0930	***Field Development Optimization*** *Well Placement Optimization • Fracture Reservoir Targeting • Depletion Strategy Simulation • Production Forecast Scenarios*
0930 – 0945	*Break*
0945 – 1100	***Risk & Uncertainty Management*** *Geological versus Operational Risks • Scenario-Based Sensitivity Analysis • Value of Information Assessment • Tiered Decision-Making Frameworks*
1100 - 1230	***Digital & AI-Assisted Integration Tools*** *Machine Learning in Well Log Prediction • Seismic Facies Classification Using Deep Learning • Real-Time Geomechanics Monitoring • Digital Twin Applications for Reservoir Modeling*
1230 – 1245	*Break*
1245 – 1345	***Case Studies from Different Basins*** *Carbonate Middle East Fields • Unconventional Tight/Shale Reservoirs • West Africa Clastic Basins • North Sea Mature Fields Revitalization*
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*

Simulator (Hands-on Practical Sessions)

Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the "Petrel" and "Techlog" software.



Petrel Software



Techlog Software

Course Coordinator

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