Haward Technology Middle East

COURSE OVERVIEW DE0054
Advanced Seismic Data Acquisition & Processing

Course Title
Advanced Seismic Data Acquisition & Processing

Course Date/Venue
Session 1: May 19-23, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
Session 2: November 09-13, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
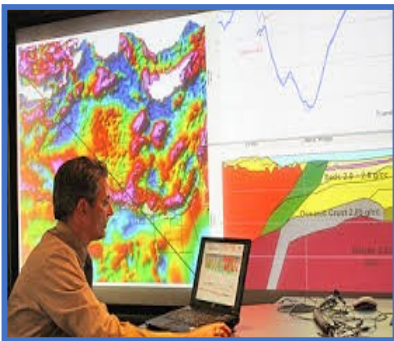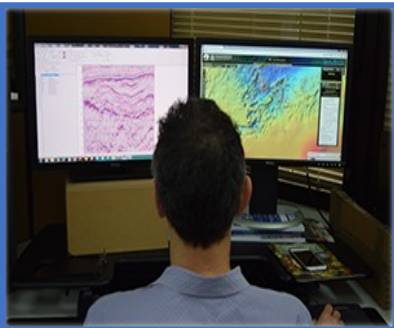
Course Reference
DE0054

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 Advanced Seismic Data Acquisition and Processing. It covers the basic principles of seismic reflection and refraction; the types of seismic surveys and seismic data processing steps; the seismic data acquisition, seismic source types and design and receiver types design; the field procedure for data acquisition and quality control for field data; the data preparation and quality control, trace editing and filtering, static corrections and noise reduction techniques; the seismic imaging, migration algorithms, velocity analysis and imaging and imaging quality control; and the quantitative interpretation, seismic inversion methods, rock physics modeling and interpretation quality control.
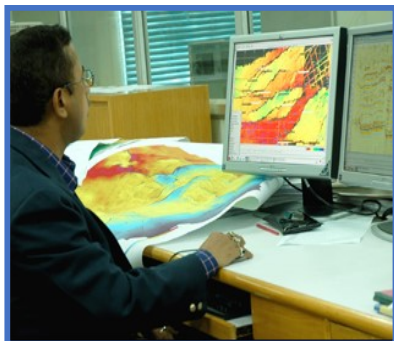
During this interactive course, participants will learn the time-lapse seismic imaging, reservoir changes, data processing challenges and quality control; the multicomponent seismic data and high-frequency seismic data; the data acquisition and processing for multicomponent surveys and for high-frequency surveys; the multicomponent data and high-frequency data; the multicomponent seismology and high frequency seismic data; the seismic attributes, basic seismic and advanced seismic attribute analysis and interpretation; the emerging seismic data acquisition and processing technologies; and the advantages and limitations and future directions in seismic data acquisition and processing.

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

- Apply and gain an advanced knowledge on seismic data acquisition and processing

- Discuss the basic principles of seismic reflection and refraction

- Identify the types of seismic surveys and seismic data processing steps

- Recognize seismic data acquisition, seismic source types and design and receiver types design

- Carryout field procedure for data acquisition and quality control for field data

- Apply data preparation and quality control, trace editing and filtering, static corrections and noise reduction techniques

- Illustrate seismic imaging, migration algorithms, velocity analysis and imaging and imaging quality control

- Implement quantitative interpretation, seismic inversion methods, rock physics modeling and interpretation quality control

- Apply time-lapse seismic imaging, monitoring reservoir changes, data processing challenges in time-lapse imaging and quality control for time-lapse data

- Discuss multicomponent seismic data and high-frequency seismic data as well as data acquisition and processing for multicomponent surveys and for high-frequency surveys

- Interpret multicomponent data and high-frequency data as well as apply multicomponent seismology and high frequency seismic data

- Discuss seismic attributes, basic seismic attribute analysis, advanced seismic attribute analysis and interpretation of seismic attributes

- Determine emerging seismic data acquisition and processing technologies including its advantages and limitations and future directions in seismic data acquisition and processing

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 advanced seismic data acquisition and processing for all geoscientists, geophysicists, seismic interpreters, seismic acquisition and processing specialists, reservoir engineers and project managers.

Course Certificate(s)

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

Certificate Accreditations

Certificates are accredited by the following international accreditation organizations:-

- **BAC** 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.

- **IACET** 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 **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 Geology & 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

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	**PRE-TEST**
0830 – 0930	**Introduction to Seismic Data Acquisition & Processing** *Basic Principles of Seismic Reflection & Refraction • Types of Seismic Surveys • Seismic Data Processing Steps*
0930 – 0945	*Break*
0945 – 1115	**Seismic Data Acquisition** *Seismic Source Types & Design • Receiver Types & Design*
1115 – 1215	**Seismic Data Acquisition (cont'd)** *Field Procedures for Data Acquisition*
1215 – 1230	*Break*
1230 – 1420	**Seismic Data Acquisition (cont'd)** *Quality Control for Field Data*
1420 – 1430	**Recap**
1430	*Lunch & End of Day One*

Day 2

0730 – 0930	**Seismic Data Processing I – Preprocessing** *Data Preparation & Quality Control • Trace Editing & Filtering*
0930 – 0945	*Break*
0945 – 1100	**Seismic Data Processing I – Preprocessing (cont'd)** *Static Corrections (e.g. Elevation, Weathering, etc.) • Noise Reduction Techniques (e.g. Deconvolution, Wavelet Estimation, etc.)*

1100 – 1230	**Seismic Data Processing II – Imaging** *Seismic Imaging • Migration Algorithms (e.g. Kirchhoff, Reverse Time Migration, etc.)*
1230 – 1245	*Break*
1245 – 1420	**Seismic Data Processing II – Imaging (Cont'd)** *Velocity Analysis & Imaging (e.g. Tomography, FWI, etc.) • Imaging Quality Control*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

| 0730 – 0930 | **Seismic Data Processing III - Quantitative Interpretation**
Quantitative Interpretation • Seismic Inversion Methods (e.g. Acoustic Impedance, Elastic Impedance, etc.) |
0930 – 0945	*Break*
0945 – 1100	**Seismic Data Processing III - Quantitative Interpretation (cont'd)** *Rock Physics Modeling • Interpretation Quality Control*
1100 – 1230	**Seismic Data Processing IV - Time-Lapse & Monitoring** *Time-Lapse Seismic Imaging • Monitoring Reservoir Changes*
1230 – 1245	*Break*
1245 – 1420	**Seismic Data Processing IV - Time-Lapse & Monitoring (cont'd)** *Data Processing Challenges in Time-Lapse Imaging • Quality Control for Time-Lapse Data*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

| 0730 – 0930 | **Seismic Data Processing V - Multicomponent Seismology**
Multicomponent Seismic Data • Data Acquisition & Processing for Multicomponent Surveys |
0930 – 0945	*Break*
0945 – 1100	**Seismic Data Processing V - Multicomponent Seismology (cont'd)** *Interpretation of Multicomponent Data • Applications of Multicomponent Seismology (e.g. Reservoir Characterization, Fracture Imaging, etc.)*
1100 – 1230	**Seismic Data Processing VI - High-Frequency Seismic Data** *High-Frequency Seismic Data • Data Acquisition & Processing for High-Frequency Surveys*
1230 – 1245	*Break*
1245 – 1420	**Seismic Data Processing VI - High-Frequency Seismic Data (cont'd)** *Interpretation of High-Frequency Data • Applications of High-Frequency Seismic Data (e.g. Imaging of Shallow Targets, Fracture Imaging, etc.)*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

0730 – 0930	**Seismic Data Processing VII - Seismic Attributes** *Seismic Attributes • Basic Seismic Attribute Analysis (e.g. Amplitude, Frequency, etc.)*
0930 – 0945	*Break*
0945 – 1100	**Seismic Data Processing VII - Seismic Attributes (cont'd)** *Advanced Seismic Attribute Analysis (e.g. Curvature, Dip, Texture, etc.)• Interpretation of Seismic Attributes*
1100 – 1245	**Seismic Data Processing VIII - Emerging Technologies** *Emerging Seismic Data Acquisition & Processing Technologies • Examples of Emerging Technologies (e.g. Ocean Bottom Seismic, Full Waveform Inversion, etc.)*
1245 – 1300	*Break*
1300 – 1345	**Seismic Data Processing VIII - Emerging Technologies (cont'd)** *Advantages & Limitations of Emerging Technologies • Future Directions in Seismic Data Acquisition & Processing*
1345 – 1400	**Course Conclusion**
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 "Vista" software.
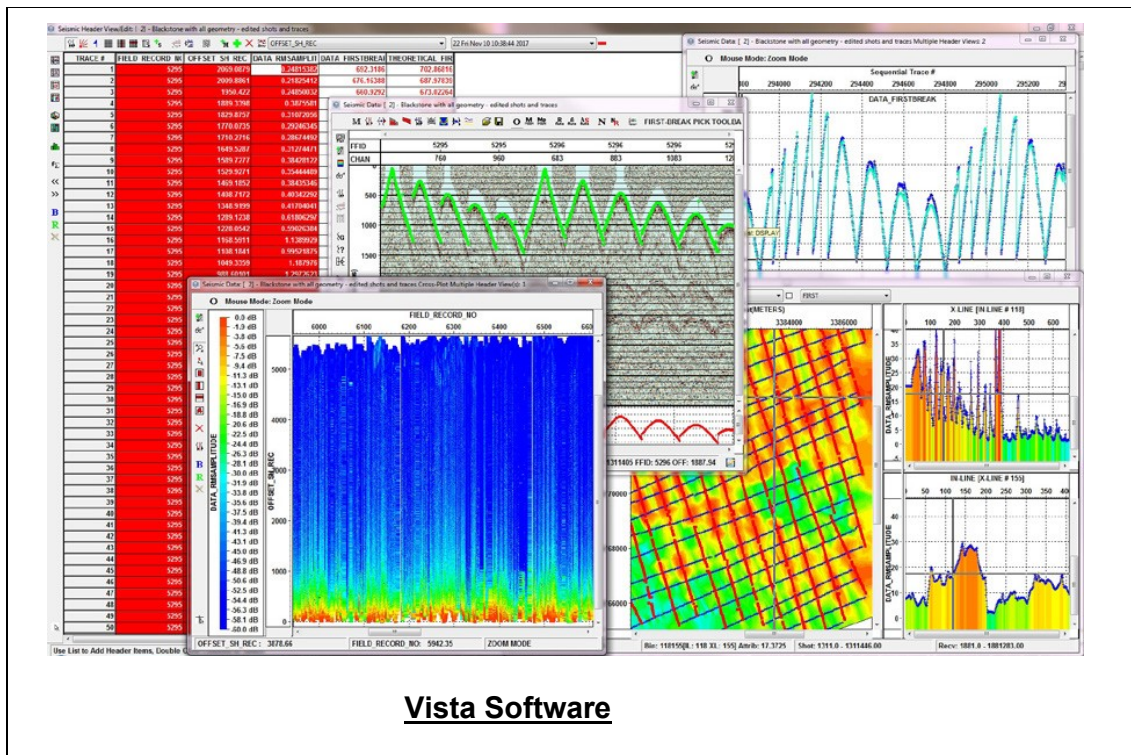
Vista Software

Vista Software
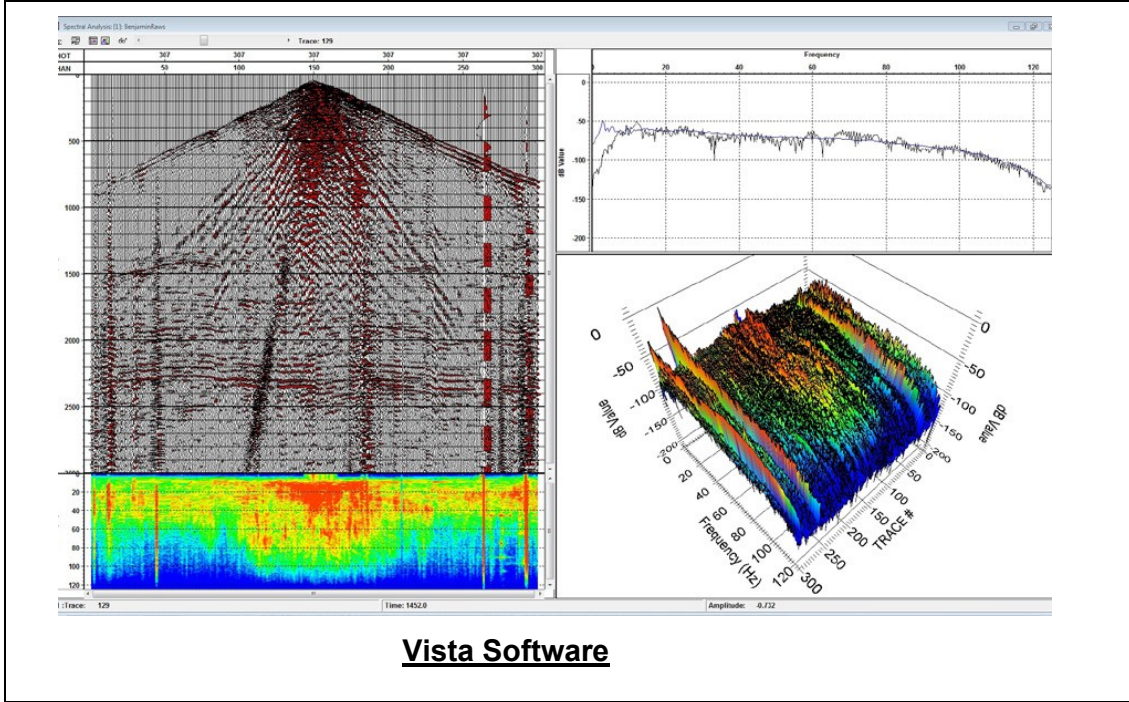
Course Coordinator
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