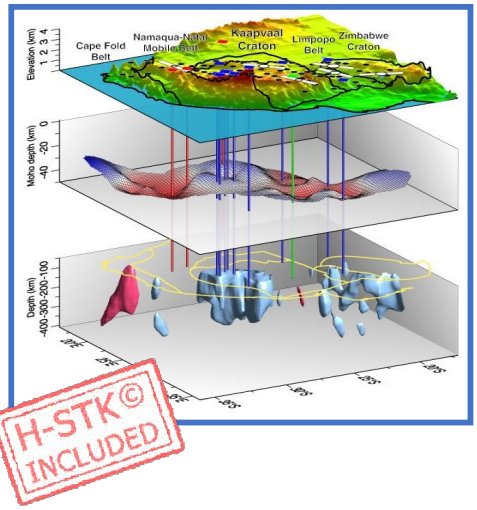
COURSE OVERVIEW DE0130
Applied Structural Geology: Magnetic and Gravity Methods

Course Title
Applied Structural Geology: Magnetic and Gravity Methods

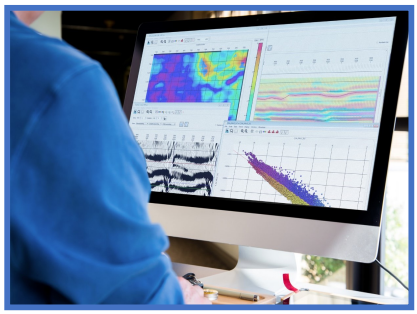


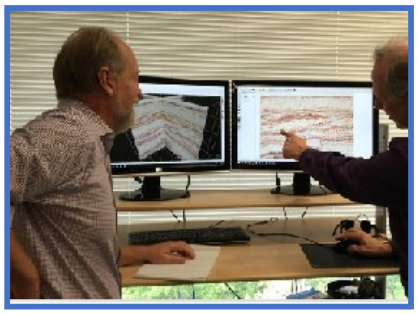
Course Date/Venue
Session 1: July 20-24, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
Session 2: December 22-26, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference
DE0130

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

Course Description





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

The main objective of seismic data application in hydrocarbon exploration has not been changed during the last 40 years. At the same time the technology of seismic methods has drastically improved and enabled exploration geophycists to meet many times higher demands involving seismic methods in every day use in reservoir exploration and development. Geological interpretation of seismic data should fulfill two main objectives: solving geometry of structures with possible hydrocarbon accumulations and correlation of recorded seismic amplitudes and velocities with lithology. The geological model is the end product of the cumulative data and interpretations from the various surface and subsurface geological studies.

The interpreter of a 3-D Seismic survey must utilize a data volume. Horizontal slices through a data volume, called Seiscrop sections, have unique properties and structural interpretation from them is fast, convenient and effective. An event on a Seiscrop section displays local strike, a property which permits direct contouring of a structural surface without any timing and posting.

The width of an event on a Seiscrop section is a composition of the frequency of the data and the structural dip. Event terminations indicate faults or other discontinuities when they are transverse to structural strike. Faults parallel to the movement of events from section to section. In practical mapping, the interpreter normally contours one fault block before proceeding to the next with the correlation between them being established from the vertical sections. With dual polarity variable area displays, the interpreter can perceive five amplitude levels and normally picks the edge of a trough. With color amplitude Seiscrop sections, it is possible to pick on the crest of any event. With color phase sections, the interpreter can pick at any arbitrary but consistent point on the seismic waveform. The horizontal perspective often permits the interpreter to recognize subtle structural features which might have gone unnoticed if studying the prospect from vertical sections alone.

Geological models are usually used qualitatively in seismic interpretation. This course illustrates that quantitative representations of detailed geological models can significantly enhance seismic attribute interpretation through facies classification. In this course, we aim to create a more accurate representation of the reservoir by using 3D synthetic Earth models to guide seismic attribute classification.

This course is designed for geoscientists involved in interpreting structurally complex seismic data. An understanding of structural styles in both profile and map view is essential for unravelling fault patterns and timing of deformation. The course is based around hands-on exercises using seismic, field, and experimental data to demonstrate the variety of structural geometries around the world. Structural techniques are introduced and applied to seismic data to show how to interpret structures, determine timing and evaluate risk

The course is designed to provide a high level insight. The course will be equally applicable to attendees irrespective of the modelling software used by their respective companies. The course is not aimed at those wishing to learn specific software skills.

Course Objectives

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

- Apply and gain an advanced knowledge on structural interpretation and geological modelling based on seismic sections
- Discuss seismology fundamentals, seismic wave propagation, wave equations, poison's ratio, seismic reflection method, wavelets, reflection coefficients, convolution, synthetic seismogram, fourier series and fourier transforms
- Identify the time domain and frequency domain, seismic acquisition, processing summary workflows, zero phase, minimum phase wavelets and normal and reverse polarities
- Recognize normal and reverse polarities, seismic attributes, petroleum geology provinces and onshore vs. offshore provinces
- Discuss worldwide distribution of petroleum basins, structural and stratigraphic traps and seismic reflection sections

- Apply filtering and deconvolution, seismic ties, time maps, four way dip closure, fault closure, contouring rules and depth conversion
- Carryout mapping techniques, depth conversion techniques, seismic data, 2D and 3D interpretation parameters and seismic speculative surveys
- Employ interpretative analysis of CDP gathers and discuss AVO amplitude variation with offset, pre-stack time migration and pre-stack depth migration
- Interpret deepwater datasets, regional interpretation mapping and interpret comparisons of South Atlantic regional lines
- Recognize salt tectonics, evaluation of prospects, risk evaluation, reverse faults, palisnspastic reconstructions and color and phase
- Apply Reservoir identification, attributes and reservoir evaluation

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 will assist geologists and geophysicists in acquiring the practical methods and skills that will improve the quality of their structural interpretation of seismic data. Further, the course is suitable for reservoir engineers who wish to gain an insight into geostatistics and the modern methods used by geologists to create reservoir models.

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.

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: -

- 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.

- 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.

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

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. Saber Hussein is a **Senior Geologist & Reservoir Engineer** with over **40 years** of extensive experience within the **Oil** & **Gas**, **Petrochemical** and **Refinery** industries. His specialization widely covers in the areas of **Open Hole Logging** Methods, Open & Cased Hole Logging, Applied **Production Logging & Cased Hole & Production Log** Evaluation, **Cased Hole Logging & Formation** Evaluation, **Cased Hole** Logging, **Wireline** Logging, **Mud** Logging, **Production** Logging, **Reservoir** Management, **Reservoir** Appraisal & Development, **Carbonate Reservoir** Management, **Fractured Reservoirs** Evaluation & Management, **Naturally Fractured Reservoir**, Integrated **Carbonate Reservoir** Characterization, **Core & Log Integration**, **Water Saturation**, **Coring & Core Analysis**, **Special Core Analysis**, **Log** Interpretation, **Core Calibration**, **Geological Modelling for Integrated Reservoir Studies**, **Reservoir Characterization**, **Geomodelling**, Development **Geology**, **Petroleum Geology**, **Exploration Production**, **Structural Geology**, **Wellsite Geology**, **Geologic** Modelling, Analytic Modelling Methods, Economic Evaluation, **Geophysics**, **Geophysical Exploration**, Advanced **Petrophysics**, **Petroleum Exploration**, **Petroleum Economics**, **Petroleum Engineering**, **Reservoir Modelling**, **Reserve Estimation**, **Reserve Evaluation**, Uncertainty Calculations, **Reservoir Management**, **Reservoir** Engineering, **Tectonics & Structural Development**, Petroleum Systems, **Reservoir Characterization**, **Clastic Reservoir**, **Carbonate Reservoir**, Subsurface Facies Analysis, **Borehole Images, Geophysical Methods**, **Oil & Gas Exploration**, **Exploration Geochemistry**, **Reservoir Performance** Using Classical Methods, **Fractured Reservoir** Evaluation & Management, **Reservoir** Surveillance & Management, **Reservoir** Engineering & Stimulation, **Reservoir Monitoring**, **Pressure Transient Testing & Reservoir** Performance Evaluation, **Reservoir Characterization**, **Reservoir** Engineering Applications, **Reservoir Volumetrics**, **Water Drive Reservoir**, **Reservoir Evaluation**, **Slick Line**, **Coil Tubing**, **Horizontal Wells**, **Well Surveillance**, **Well Testing**, Design & Analysis, **Well Testing** & Oil Well Performance, Well Log Interpretation (**WLI**), Formation Evaluation, Well Workover Supervision, **Pressure Transient Analysis**, **Petrophysical Log Analysis**, **Drilling**, **Core Analysis**, Core-to-Log Data Integration (**SCAL**), Basin Modelling & Total Petroleum System (**TPS**), **Seismic** Interpretation, **Seismic** Methods**, Seismic** Coherence Techniques, **Seismic Attribute Analysis**, **Seismic Inversion** Techniques, **Well Logging**, Rock Physics & Seismic Data, **Formation Evaluation**, **Well Testing** & Data Interpretation, **Pore Pressure** Prediction and **Oil & Gas Reserves Estimations**.

During his career life, Mr. Saber has gained his practical and field experience through his various significant position and dedication as the **Exploration General Manager & Board Member**, **Geology General Manager**, **Geological Studies Assistant General Manager**, **Mud Logging Assistant General Manager**, **Geological Operations Department Head**, **Geological Operations Section Head**, **Geologist**, **Well-Site Geologist**, **Mud Logger**, **Reservoir Engineer**, **Pressure Engineer**, **Expert** and **Senior Technical Consultant/Instructor** for various international companies such as the Suez Oil Company, DECO, DISUCO, Segulled, Geoline, Ltd.

Mr. Saber has a **Bachelor's** degree in **Geology**. Further, he is a **Certified Instructor/Trainer** and an active member of Egyptian Petroleum Exploration Society (**EPEX**), American Association of Petroleum Geologists (**AAPG**), Government Sponsored Enterprise (**GSE**) and the Petroleum and Scientific Professional Syndicate. He has further delivered numerous trainings, courses, seminars and conferences internationally.

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***
0930 – 1000	***Seismology Fundamentals*** *Reflection & Refraction*
1000 – 1015	*Break*
1015 – 1130	***Seismic Wave Propagation, Wave Equations, Poisson's Ratio***
1130 – 1200	***History of the Seismic Reflection Method***
1200 – 1215	***Wavelets, Reflection Coefficients, Convolution, Synthetic Seismogram***
1215 – 1230	***Fourier Series, Fourier Transforms***
1230 – 1245	*Break*
1245 – 1300	***Time Domain & Frequency Domain*** *Amplitude and Phase Spectrum*
1300 – 1320	***Seismic Acquisition and Processing Summary Workflows***
1320 – 1340	***Zero Phase & Minimum Phase Wavelets***
1340 – 1350	***Normal & Reverse Polarities*** *Seismic Reflection Signatures*
1350 – 1410	***Seismic Attributes***
1410 – 1420	***Petroleum Geology Provinces***
1420 – 1430	***Recap***
1430	*Lunch & of Day One*

Day 2

0730 – 0800	***Onshore vs. Offshore Provinces***
0800 – 0830	***Worldwide Distribution of Petroleum Basins***
0830 – 0900	***Structural & Stratigraphic Traps***
0900 – 0930	***Seismic Reflection Sections*** *Parameters*
0930 – 0945	*Break*
0945 – 1000	***Filtering & Deconvolution*** *Unmigrated and Migrated Sections • Dip & Strike*
1000 – 1030	***Seismic Ties, Time Maps***
1030 – 1100	***Four Way Dip Closures, Fault Closures***
1100 – 1130	***Contouring Rules***
1130 – 1200	***Contouring Exercise # 1: Anticline***
1200 – 1230	***Discussion of Contouring Rules***
1230 – 1245	*Break*
1245 – 1330	***Contouring Exercise # 2: Rifted Fault Blocks***
1330 – 1420	***Significance of Time Maps***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0800	***Depth Conversion Exercise***
0800 – 0830	***Contouring Exercise # 3: Compressional Tectonics***
0830 – 0900	***Hand Contouring vs. Computer Contouring – Discussion***
0900 – 0915	*Break*
0915 – 0945	***Mapping Exercise # 1: Basement High***
0945 – 1000	***Mapping Techniques - Discussion of Misties***
1000 – 1030	***Mapping Exercise # 2: Carbonate Build-Up***
1030 – 1100	***Seismic Velocities: Average, Interval, Nmo, Rms. Dix, Equation***
1100 – 1200	***Depth Conversion Techniques***
1200 – 1215	*Break*
1215 – 1230	***Seismic Data*** *Onshore/Offshore*
1230 – 1315	***2D & 3D Interpretation Parameters***
1315 – 1420	***Seismic Tape Formats***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

0730 – 0800	***Seismic Data Libraries*** *Discussion*
0800 – 0830	***Seismic Speculative Surveys***
0830 – 0900	***Workstations*** *Softwares*
0900 – 0915	*Break*
0915 – 0945	***Interpretative Analyses of CDP Gathers, NMO*** *Stack, F-K Filtering*
0945 – 1000	***Deconvolution & Migration*** *Exercises*
1000 – 1030	***AVO Amplitude Variation with Offset*** *Interpretation Exercise*
1030 – 1100	***Pre-Stack Time Migration (PSTM)***
1100 – 1200	***Pre-Stack Depth Migration (PSDM)***
1200 – 1215	***Deepwater Datasets – Interpretation***
1215 – 1230	*Break*
1230 – 1300	***Regional Interpretation Mapping***
1300 – 1345	***Interpretation Comparisons of South Atlantic Regional Lines*** *Exercises*
1345 – 1420	***Salt Tectonics*** *Interpretation Exercise*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

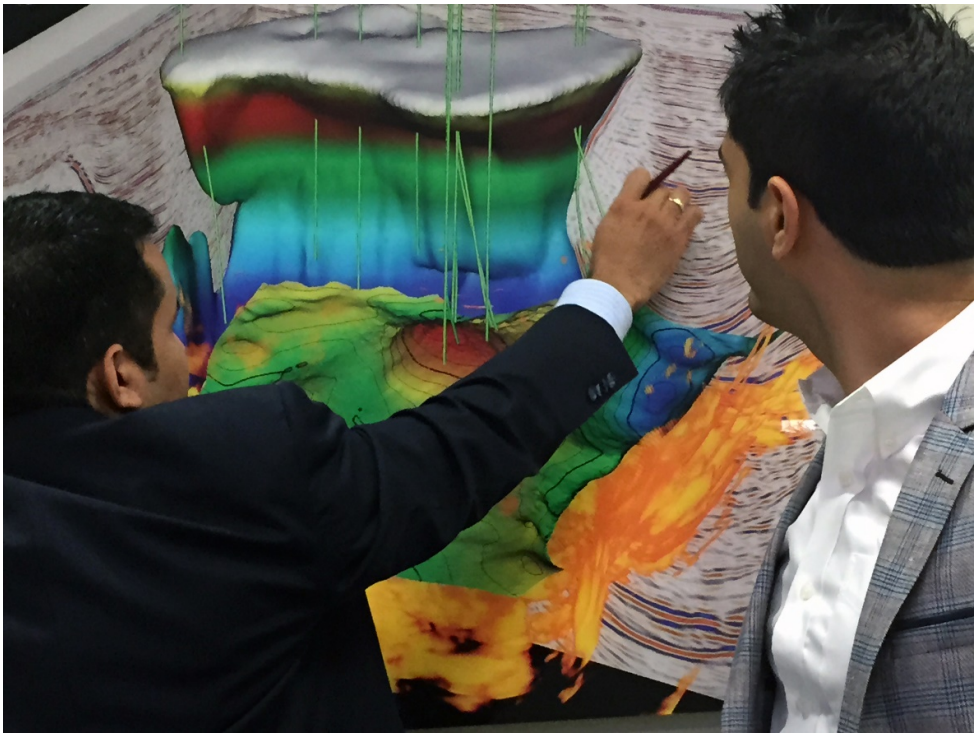
Day 5

0730 – 0800	***Evaluation of Prospects***
0800 – 0830	***Risk Evaluation*** *Monte Carlo Techniques*
0830 – 0900	***Mapping Exercise # 3: Rift Basin*** *Normal Fault Blocks*
0900 – 0915	*Break*

0915 – 0945	***Reverse Faults*** *Paleo-Highs and Paleo-Lows*
0945 – 1000	***Palisnspastic Reconstructions***
1000 – 1030	***Mapping Exercise # 4: Compressional Tectonics***
1030 – 1100	***Color & Phase*** *Limitations of Conventional Display • Color Principles • Contrasting and Gradational Color Schemes • Visibility of Amplitude Detail • Recommended Scales • Recognition of Zero-Phaseness • Definition of European and American Polarity*
1100 – 1130	***Reservoir Identification*** *Bright Spots • Dim Spots • Phase Changes • Flat Spots and their Many Necessary Characteristics • Impact of Color • Amplitude and Display Scales • Use of Top and Base Reflections • Natural Pairing*
1130 – 1215	***Reservoir Identification (cont'd)*** *Spatial Relationships • Tuning Phenomena in Reservoir Reflections • Importance of Zero-Phaseness and Knowledge of Polarity • Approach to Validation • Reservoir Limits • Occurrence of Fluid Effects • Reservoir Identification Exercise*
1215 – 1230	*Break*
1230 – 1300	***Attributes*** *Classification • Amplitude-Derived and Frequency-Derived Attributes • Complex Trace Attributes • Hybrid Attributes • Geologic Frequency • Spectral Decomposition • 3-D AVO*
1300 – 1320	***Reservoir Evaluation*** *Properties Affecting Amplitude • Interpretation Regimes • Well Calibration • Composite Amplitude • Mapping of Porosity*
1320 – 1345	***Reservoir Evaluation (cont'd)*** *Net-To-Gross and Net Pay Thickness • Tuning Estimation and Removal • Pore Volume • Case Histories*
1345 - 1400	***Course Conclusion***
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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