

COURSE OVERVIEW DE0386
Practical AVO & Seismic Inversion with Petrel

Course Title

Practical AVO & Seismic Inversion with Petrel

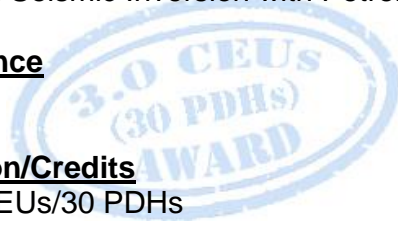
Course Reference

DE0386

Course Duration/Credits

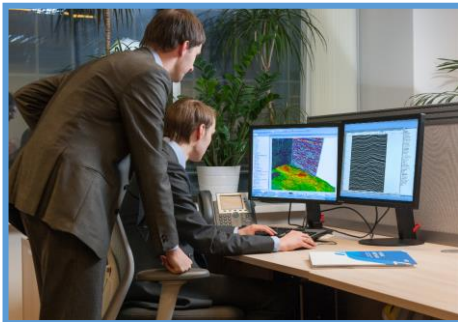
Five days/3.0 CEUs/30 PDHs

Course Date/Venue



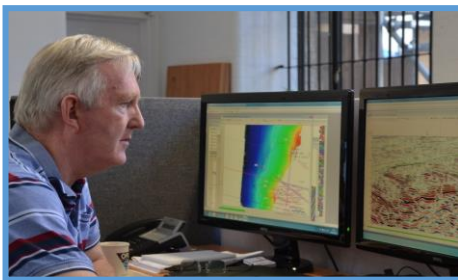
Session(s)	Date	Venue
1	April 21-25, 2024	Oryx Meeting Room, DoubleTree By Hilton Doha-Al Sadd, Doha, Qatar
2	May 26-30, 2024	
3	October 13-17, 2024	
4	November 24-28, 2024	

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 Practical AVO & Seismic Inversion with Petrel. It covers the seismic data concepts, principles of AVO analysis and Petrel software for seismic analysis; preparing data for AVO analysis, the key seismic attributes for AVO and AVO crossplotting in Petrel; the Gassmann's equations and fluid substitution modelling; the AVO modeling and classifications; using AVO for hydrocarbon indication and linking rock properties to seismic response; the concept, purpose and types of seismic inversion; and the data requirements and preprocessing steps in Petrel.



During this interactive course, participants will learn the deterministic inversion techniques in Petrel; analyzing and validating inversion results; the principles and application of stochastic inversion methods in reservoir characterization; integrating geological inversion techniques; extracting quantitative information from inversion data; integrating seismic inversion with petrophysical analysis to enhance reservoir models; combining AVO analysis with inversion for comprehensive interpretation; managing uncertainties and assessing risks and best practices in AVO and seismic inversion to ensure accuracy and reliability; reporting and presenting result effectively; and the emerging technologies and trends in seismic analysis.



Course Objectives

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

- Apply and gain an in-depth knowledge on practical AVO and seismic inversion with Petrel
- Discuss the seismic data concepts, principles of AVO analysis and Petrel software for seismic analysis
- Prepare data for AVO analysis and identify key seismic attributes for AVO and AVO crossplotting in Petrel
- Illustrate Gassmann's equations and fluid substitution modelling including AVO modeling and classifications
- Use AVO for hydrocarbon indication and link rock properties to seismic response
- Recognize the concept, purpose and types of seismic inversion including the data requirements and preprocessing steps in Petrel
- Implement and interpret deterministic inversion techniques in Petrel as well as analyze and validate inversion results
- Discuss the principles and application of stochastic inversion methods in reservoir characterization and integrate geological inversion techniques
- Extract quantitative information from inversion data and integrate seismic inversion with petrophysical analysis to enhance reservoir models
- Combine AVO analysis with inversion for comprehensive interpretation
- Manage uncertainties and assess risks as well as implement best practices in AVO and seismic inversion to ensure accuracy and reliability
- Report and present results effectively and identify the emerging technologies and trends in seismic analysis

Exclusive Smart Training Kit - H-STK®



Participants of this course will receive the exclusive "Howard 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 practical AVO and seismic inversion with Petrel for geophysicists, reservoir engineers, petroleum geologists, Petrel software users, exploration and production (E&P) professionals and those who have responsibilities related to seismic data interpretation, amplitude versus offset (AVO) analysis and seismic inversion using the Petrel software platform.

Course Fee


US\$ 8,500 per Delegate. This rate includes H-STK® (Howard 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: -

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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.

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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.

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. Ahmed Abdelrazik, is a **Senior Drilling & Petroleum Engineer** with extensive years of **onshore & offshore** experience within the **Oil & Gas, Refinery** and **Petroleum** industries. His experience widely covers in the areas of **Well Test Design & Analysis, Well Test Analysis, Well Test Operations, Well Testing Completion & Workover, Well Integrity & Artificial Lift, Well Integrity Management, Wellhead Integrity, Wellhead Maintenance & Operations, Well Completion Design & Operations, Well Head Design, Well Drilling & Completion, Horizontal Well Control, Drilling Optimization & Well Planning, Well Production Optimisation, Well Control & Blowout Prevention, Nodal Analysis, Advanced Production Data Analysis & Nodal Analysis, ESP & Optimization using Nodal Analysis, Well Performance using Nodal System Analysis, Advanced Reservoir & Production Engineering, Advanced Reservoir Fluid Properties & EOS, Applier Reservoir Formation Well Deliverability Analysis, Depositional Environments & Geometry of Sandstone & Carbonate Reservoirs, Geomechanics & Petroleum Implications, Integrated Carbonate Reservoir Characterization, Naturally Fractured Reservoirs, Pressure Transient Testing & Reservoir Performance Evaluation, Integrated Reservoir Studies, Reservoir Production Operations, Reservoir Characterization, Reservoir Surveillance & Management, Reservoir & Facility Management, Advanced Reservoir Geology & Sedimentology, Production Logging & Reservoir Monitoring, Eclipse Black Oil, Hazard Identification & Risk Assessment, Lifesaving on Offshore Rig, OFM Monitoring & Surveillance Workflows, Sand Production Management, Well Completion Technology, Subsea Landing String Services, Waterflood & EOR, TCP & Casing Gun Perforation, Hydraulic Fracture, DST, RFT, ESP & Sucker Rod Pump Installation & Replacement, Open Hole Logs, Coiled Tubing & Lifting with Nitrogen, Detailed Analysis on Pressure, Volume & Temperature (PVT), Special Core Analysis (SCAL), Waterflooding & EOR and Applied Reservoir Evaluation. He has also experience with some of the software's like the Eclipse, Petrel, OFM, Saphir, Topaze, Emeraude, RTA, GAP, Prosper, MBAL, PVTP, PVTsim and Pipesim. He is currently the **Senior Reservoir Engineer** of Rashid Petroleum Company wherein he is involved in leading and conducting subsurface related studies, routine reservoir engineering tasks, reservoir analytical studies, reserves reporting, well and reservoir performance review.**

During Mr. Ahmed's life, he has gained his practical and field experience through his various significant positions as the **Reservoir Engineer Specialist, Reservoir & Development Specialist, Reservoir Engineer** for numerous international companies such as the **PetroChina, Egyptian Natural Gas Holding Company, Khalda Petroleum Company, Wastani Petroleum Company** and **Rashid Petroleum Company**.

Mr. Ahmed has a **Bachelor's** degree in **Petroleum Engineering**. Further, he is a **Certified Instructor/Trainer** and a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership and Management (ILM)**. He has further published scientific papers and delivered numerous trainings, workshops and conferences 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 workshop for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1

0730 – 0800	<i>Registration & Coffee</i>
0800 – 0815	<i>Welcome & Introduction</i>
0815 – 0830	PRE-TEST
0830 – 0930	Overview of Seismic Data Concepts: Seismic Waves, Reflection & Recording
0930 – 0945	<i>Break</i>
0945 – 1030	Principles of AVO Analysis: Theory & Basic Concepts of Amplitude Versus Offset
1030 – 1130	Petrel Software for Seismic Analysis: Navigating & Using Petrel for Seismic Data
1130 – 1215	Data Preparation for AVO Analysis: Importing & Conditioning Seismic Data in Petrel
1215 – 1230	<i>Break</i>
1230 – 1330	Basic Seismic Attributes & their Interpretation: Identifying Key Seismic Attributes for AVO
1330 – 1420	Case Studies: Review of Basic AVO Analysis in Exploration Scenarios
1420 – 1430	Recap
1430	<i>Lunch & End of Day One</i>

Day 2

0730 – 0830	AVO Crossplotting in Petrel: Techniques & Applications of Crossplotting for AVO Analysis
0830 – 0930	Fluid Substitution Modeling: Gassmann's Equations & Fluid Substitution Effects
0930 – 0945	<i>Break</i>
0945 – 1100	AVO Modeling & Classifications: Detailed Analysis of AVO Responses & Classes
1100 – 1215	Direct Hydrocarbon Indicator (DHI) Identification: Using AVO for Hydrocarbon Indication
1215 – 1230	<i>Break</i>
1230 – 1330	Integrating Rock Physics with AVO: Linking Rock Properties to Seismic Response
1330 – 1420	Practical Exercise: Conducting AVO Analysis on Provided Seismic Datasets
1420 – 1430	Recap
1430	<i>Lunch & End of Day Two</i>



Day 3

0730 – 0830	Fundamentals of Seismic Inversion: The Concept & Purpose of Seismic Inversion
0830 – 0930	Types of Seismic Inversion: Deterministic, Stochastic & Geostatistical Inversion
0930 – 0945	Break
0945 – 1100	Preparing Data for Seismic Inversion: Data Requirements & Preprocessing Steps in Petrel
1100 – 1215	Deterministic Inversion Techniques: Implementation & Interpretation in Petrel
1215 – 1230	Break
1230 – 1330	Inversion Outputs: Analyzing & Validating Inversion Results
1330 – 1420	Workshop: Hands-On Seismic Inversion Using Petrel
1420 – 1430	Recap
1430	Lunch & End of Day Three

Day 4

0730 – 0830	Stochastic Inversion Methods: Principles & Application in Reservoir Characterization
0830 – 0930	Geostatistical Inversion Techniques: Integrating Geological Constraints in Inversion
0930 – 0945	Break
0945 – 1100	Quantitative Interpretation of Inversion Results: Extracting Quantitative Information from Inversion Data
1100 – 1215	Integrating Seismic Inversion with Petrophysical Analysis: Enhancing Reservoir Models with Inversion Data
1215 – 1230	Break
1230 – 1330	Case Studies in Seismic Inversion: Reviewing Advanced Inversion Scenarios & Results
1330 – 1420	Group Activity: Collaborative Seismic Inversion Project
1420 – 1430	Recap
1430	Lunch & End of Day Four

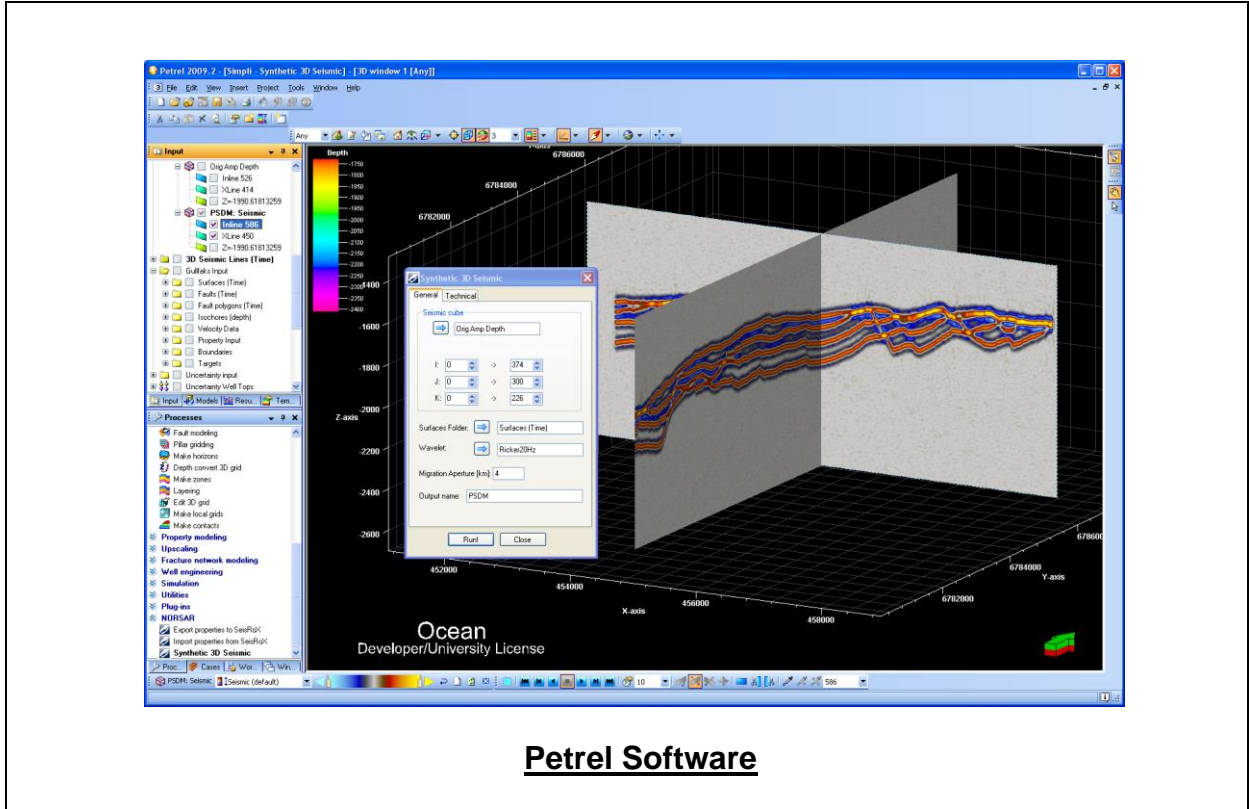
Day 5

0730 – 0830	Integrating AVO & Inversion Results: Combining AVO Analysis with Inversion for Comprehensive Interpretation
0830 – 0930	Risk Assessment in AVO & Seismic Inversion: Managing Uncertainties & Assessing Risks
0930 – 0945	Break
0945 – 1100	Best Practices in AVO & Seismic Inversion: Ensuring Accuracy & Reliability
1100 – 1230	Reporting & Presenting Results: Effective Communication of Analysis Results
1230 – 1245	Break
1245 – 1345	Emerging Technologies & Trends in Seismic Analysis: Staying Updated with Industry Advancements
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 “Petrel” software.



Petrel Software

Course Coordinator

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