

COURSE OVERVIEW DE0395

Rock Physics – Integrating Petrophysical, Geomechanics and Seismic Measurements

Course Title

Rock Physics – Integrating Petrophysical, Geomechanics and Seismic Measurements

Course Date/Venue

Session 1: January 05-09, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Session 2: July 07-11, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE



Course Reference

DE0395

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.



This course is designed to provide participants with a detailed and up-to-date overview of Integrating Petrophysical, Geomechanical & Seismic Measurements of Rock Physics. It covers the importance of rock physics in oil and gas exploration and production; the basic principles of rock physics; the rock types and textures, petrophysical properties of rocks and elastic properties of rocks; the laboratory measurement techniques, well log interpretation, petrophysical evaluation of reservoirs and fluid substitution analysis; and the impact of rock water on petrophysical properties.



Further, the course will also discuss the importance on capillary pressure and relative permeability in rock physics; the principle of geomechanics, in-situ stress and strain analysis and rock mechanical properties and their measurement; the wellbore stability and sand production; and the fracture mechanics in rock physics and seismic wave propagation in rocks.

During this interactive course, participants will learn the amplitude versus offset (AVO) and inversion techniques; the rock physics templates (RPTs) and 4D seismic and rock physics; the rock physics modeling and simulation; integrating petrophysical, geomechanical and seismic data; the uncertainty analysis in rock physics and the emerging technologies in rock; and the application in unconventional reservoirs.

Course Objectives

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

- Apply and gain an in-depth knowledge on integration of petrophysical, geomechanical and seismic measurements in rock physics
- Discuss the importance of rock physics in oil and gas exploration and production including the basic principles of rock physics
- Identify the rock types and textures, petrophysical properties of rocks and elastic properties of rocks
- Carryout laboratory measurement techniques, well log interpretation, petrophysical evaluation of reservoirs and fluid substitution analysis
- Describe the impact of rock water on petrophysical properties and its importance of capillary pressure and relative permeability in rock physics
- Discuss the principle of geomechanics, apply in-situ stress and strain analysis and recognize rock mechanical properties and their measurement
- Carryout wellbore stability and sand production and describe the fracture mechanics in rock physics, seismic wave propagation in rocks and seismic attributes and rock physics
- Carryout amplitude versus offset (AVO) and inversion techniques and discuss rock physics templates (RPTs) and 4D seismic and rock physics
- Illustrate rock physics modeling and simulation and integrate petrophysical, geomechanical and seismic data
- Carryout uncertainty analysis in rock physics and recognize the emerging technologies in rock physics as well as the application in unconventional reservoirs

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, geomechanical and seismic measurements in rock physics for geoscientists, petrophysicists, seismic interpreters, reservoir engineers, geomechanical engineers, exploration and production managers and other technical staff.

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 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 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. Stan Constantino, MSc, BSc, is a **Senior Petroleum & Reservoir Engineer** with over **40 years** of **Offshore & Onshore** extensive experience within the **Oil, Gas & Petroleum** industries. His area of expertise include **Cased Hole Logging**, **Advanced Petrophysics/Interpretation of Cased Hole Logs**, **Cased Hole Formation Evaluation**, **Cased Hole Evaluation**, **Cased-Hole Logging**, **Applied Production Logging & Cased Hole & Production Log Evaluation**, **Cased Hole Logging & Formation Evaluation**, **Open & Cased Hole Logging**, **Fractured Reservoir Classification & Evaluation**, **Screening of Oil Reservoirs for Enhanced Oil Recovery**, **Oil Reservoir Evaluation & Estimation**, **Reserves & Resources**, **Reserves Estimation & Uncertainty**, **Reserve Evaluation**, **OIP Estimation & Range of Uncertainty**, **Reservoir Characterization**, **Water Flooding**, **Reservoir Souring & Water Breakthrough**, **Reservoir Performance Using Classical Methods**, **Fractured Reservoir Evaluation & Management**, **Reservoir Surveillance & Management**, **Reservoir Engineering & Simulation**, **Reservoir Monitoring**, **Pressure Transient Testing & Reservoir Performance Evaluation**, **Reservoir Characterization**, **Reservoir Engineering Applications with ESP & Heavy Oil**, **Reservoir Volumetrics**, **Water Drive Reservoir**, **Unconventional Resource & Reserves Evaluation**, **Oil & Gas Reserves Estimation**, **Petrophysics & Rock Properties**, **Seismic Technology**, **Geological Modelling**, **Water Saturation**, **Crude Oil & Natural Gas Demand**, **Exploration Agreements & Financial Modelling**, **Seismic Survey Evaluation**, **Exploration Well Identification**, **Field Production Operation**, **Field Development Evaluation**, **Crude Oil Marketing**, **Core & Log Data Integration**, **Core Logging**, **Advanced Core & Log Integration**, **Well Logs & Core Analysis**, **Enhanced Oil Recovery**, **Enhanced Oil Recovery Techniques**, **Petroleum Economic Analysis**, **Oil Industry Orientation**, **Oil Production & Refining**, **Crude Oil Market**, **Global Oil Supply & Demand**, **Global Oil Reserves**, **Crude Oil Types & Specifications**, **Oil Processing**, **Oil Transportation-Methods**, **Oil & Gas Exploration and Methods**, **Oil & Gas Extraction**, **Technology Usage in Industrial Security**; **Upstream, Midstream & Downstream Operations**; **Oil Supply & Demand**, **Oil Contracts**, **Government Legislation & Oil Contractual Agreements**, **Oil Projects & Their Feasibility (revenue and profitability)**, **Rock & Fluid Properties**, **Fluid Flow Mechanics**, **PVT Analysis**, **Material Balance**, **Darcy's Law & Applications**, **Radial Flow**, **Gas Well Testing**, **Natural Water Influx**, **EOR Methods**, **Directional Drilling**, **Drilling Production & Operations**, **Field Development & Production of Oil & Gas**, **Wireline Logging**, **Mud Logging**, **Production Logging**, **Slick Line**, **Coil Tubing**, **Exploration Wells Evaluation**, **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** and **Petrophysical Log Analysis**. Currently, he is the **CEO & Managing Director** of **Geo Resources Technology** wherein he is responsible in managing the services and providing technical supports to underground energy related projects concerning **field development**, **production**, **drilling**, **reservoir engineering** and **simulation**.

Throughout his long career life, Mr. Stan has worked for many international companies such as the **Kavala Oil**, **North Aegean Petroleum Company** and **Texaco Inc.**, as the **Managing Director**, **Operations Manager**, **Technical Trainer**, **Training Consultant**, **Petroleum Engineering & Exploration Department Head**, **Assistant Chief Petroleum Engineer**, **Reservoir Engineer**, **Resident Petroleum Engineer**, **Senior Petroleum Engineer** and **Petroleum Engineer** wherein he has been managing the evaluation of exploration wells, reservoir simulation, development training, production monitoring, wireline logging and well testing including selection and field application of well completion methods.

Mr. Stan has a **Master's degree** in **Petroleum Engineering** and a **Bachelor's degree** in **Geology** from the **New Mexico Institute of Mining & Technology (USA)** and from the **Aristotelian University (Greece)** respectively. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership of Management (ILM)** and a member of the **Society of Petroleum Engineers, USA (SPE)**, **Society of Well Log Professional Analysts, USA (SPWLA)** and **European Association of Petroleum Geoscientists & Engineers (EAGE)**. Moreover, Mr. Stan published numerous scientific and technical papers and delivered various trainings, courses and workshops 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 Rock Physics: Importance in Oil & Gas Exploration & Production
0930 – 0945	<i>Break</i>
0945 – 1030	Basic Principles of Rock Physics: Relationships Between Rock Properties
1030 – 1130	Rock Types & Textures: Influence on Physical Properties
1130 – 1215	Petrophysical Properties of Rocks: Porosity, Permeability & Fluid Saturation
1215 – 1230	<i>Break</i>
1230 – 1330	Elastic Properties of Rocks: Young's Modulus, Poisson's Ratio & Bulk Modulus
1330 – 1420	Laboratory Measurement Techniques: Methods for Measuring Rock Properties
1420 – 1430	Recap
1430	<i>Lunch & End of Day One</i>

Day 2

0730 – 0830	Well Log Interpretation: Log Responses in Terms of Rock Properties
0830 – 0930	Petrophysical Evaluation of Reservoirs: Determining Reservoir Quality Using Well Logs
0930 – 0945	<i>Break</i>
0945 – 1100	Fluid Substitution Analysis: Gassmann's Equations & Fluid Effects on Rock Properties
1100 – 1215	Rock-Water Interaction: Impact on Petrophysical Properties
1215 – 1230	<i>Break</i>
1230 – 1330	Capillary Pressure & Relative Permeability: Their Importance in Rock Physics
1330 – 1420	Case Studies: Real-World Examples of Petrophysical Data Analysis
1420 – 1430	Recap
1430	<i>Lunch & End of Day Two</i>



Day 3

0730 – 0830	Principles of Geomechanics: Stress, Strain, & Rock Strength
0830 – 0930	In-Situ Stress & Strain Analysis: Techniques for Determining Stress Orientations & Magnitudes
0930 – 0945	Break
0945 – 1100	Rock Mechanical Properties & Their Measurement: Laboratory & Field Methods
1100 – 1215	Wellbore Stability & Sand Production: Analysis & Prevention Strategies
1215 – 1230	Break
1230 – 1330	Fracture Mechanics in Rock Physics: Fracture Propagation & Its Impact
1330 – 1420	Practical Exercise: Geomechanical Modeling Using Field Data
1420 – 1430	Recap
1430	Lunch & End of Day Three

Day 4

0730 – 0830	Seismic Wave Propagation in Rocks: Basics of Seismic Wave Behavior in Different Rock Types
0830 – 0930	Seismic Attributes & Rock Physics: Linking Seismic Attributes to Rock Properties
0930 – 0945	Break
0945 – 1100	AVO (Amplitude Versus Offset) & Inversion Techniques: Principles & Applications
1100 – 1215	Rock Physics Templates (RPTs): Creating & Using RPTs for Seismic Interpretation
1215 – 1230	Break
1230 – 1430	4D Seismic & Rock Physics: Monitoring Reservoir Changes Over Time
1420 – 1430	Recap
1430	Lunch & End of Day Four

Day 5

0730 – 0830	Rock Physics Modeling & Simulation: Advanced Models for Predicting Rock Behavior
0830 – 0930	Integration of Petrophysical, Geomechanical & Seismic Data: Building a Comprehensive Subsurface Model
0930 – 0945	Break
0945 – 1100	Uncertainty Analysis in Rock Physics: Assessing & Managing Uncertainties in Predictions
1100 – 1230	Emerging Technologies in Rock Physics: Latest Tools & Techniques
1230 – 1245	Break
1245 – 1345	Applications in Unconventional Reservoirs: Specific Considerations for Shale, Tight Gas Etc.
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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