

COURSE OVERVIEW DE0087
Fractured Reservoir Characterization

Course Title

Fractured Reservoir Characterization

Course Date/Venue

Please refer to page 3

Course Reference

DE0087

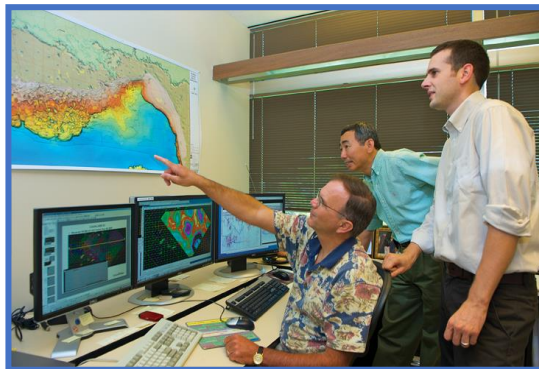
Course Duration/Credits

Five days/3.0 CEUs/30 PDHs

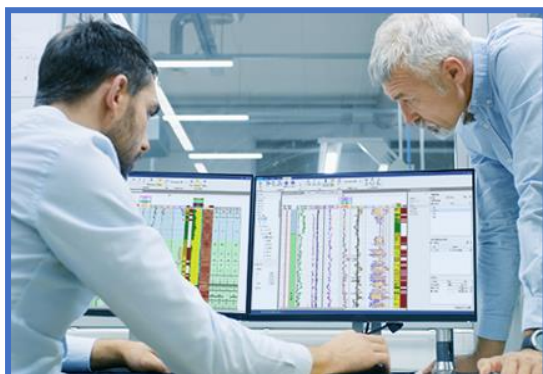
Course Description



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.



More than fifty percent of the petroleum reservoirs are in carbonate rocks. In the Middle East, it is estimated that this number increases to seventy percent. A great number of these reservoirs are naturally fractured, e.g., Ghawar field, in Saudi Arabia, Cantarell field in Mexico and Yates field in the USA. These are three of the largest fields in the world. The interest in such fields has grown tremendously.



The presence of extensive networks of natural fractures creates a number of challenges for evaluating and optimizing recovery from naturally fractured reservoirs. The use of dual porosity or dual permeability models is often necessary, providing the basis for both analytical methods (such as used for pressure transient analysis) as well as for reservoir simulation. Appropriate application of dual porosity and dual permeability models, however, rely on: a) accurate representation of the fracture system as an equivalent porous and permeable medium, and b) accurate determination of the rates of fluid transport between matrix blocks and the fracture system.

This course is designed to provide different approaches for evaluation and characterization of heterogeneous naturally fractured carbonate reservoirs by wire-line log, core analysis and well testing. Different methods for modelling and dynamic simulation of naturally fractured reservoirs and case histories will be reviewed including multiple porosity model with structured grids and single porosity with unstructured grids. Production data analysis of unconventional reservoirs will also be reviewed.

The course covers the fractured reservoirs, learn how to recognize and evaluate natural fractured reservoir; the overall effect of natural fractures on subsurface fluid-flow; the techniques that employ outcrop and subsurface rock data; the methods for controlling short-term and long-term performance in fractured reservoirs; the various types of data necessary to evaluate and manage them; and the geologic aspects, origin and classification of fractured reservoirs.

During this interactive course, participants will learn the geologic aspects and petrophysics properties of carbonate rock; the overall effect of natural fractures on subsurface fluid-flow; the reservoir characterization principals and techniques that employ outcrop and subsurface rock data; the types of data necessary to characterize the natural fracture reservoir and the modelling work flow; the fracture reservoir characterizing model can be constructed emphasizing on carbonate; the methods for controlling short-term and long-term performance in fractured reservoirs; and the geologic aspects, petrophysics and rock properties.

Course Objectives

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

- Apply and gain an in-depth knowledge on fractured reservoir characterization with emphasis on carbonates
- Classify fractured reservoirs, learn how to recognize and evaluate natural fractured reservoir
- Predict the overall effect of natural fractures on subsurface fluid-flow
- Illustrate techniques that employ outcrop and subsurface rock data
- Carryout methods for controlling short-term and long-term performance in fractured reservoirs
- Identify the various types of data necessary to evaluate and manage them
- Discuss the geologic aspects, origin and classification of fractured reservoirs
- Discuss the geologic aspects and petrophysics properties of carbonate rock.
- Predicting the overall effect of natural fractures on subsurface fluid-flow
- Learn how to recognize and evaluate natural fractured reservoir.
- Discuss the reservoir characterization principals and techniques that employ outcrop and subsurface rock data.
- Discuss the types of data necessary to characterize the natural fracture reservoir and the modelling work flow.
- Discuss how fracture reservoir characterizing model can be constructed emphasizing on carbonate

- Explain methods for controlling short-term and long-term performance in fractured reservoirs.
- Discuss the geologic aspects, petrophysics and rock properties

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 fractured reservoir characterization with emphasis on carbonates for geologists, petrophysicists, geophysicists and reservoir engineers involved in the development and management of fractured carbonate reservoirs.

Course Fee

Doha	US\$ 8,500 per Delegate. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day
Dubai	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.
Abu Dhabi	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.
Al Khobar	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 Date/Venue


Session(s)	Date	Venue
1	April 28-May 02, 2024	Oryx Meeting Room, Doubletree By Hilton Doha-Al Sadd, Doha, Qatar
2	May 26-30, 2024	Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
3	August 12-16, 2024	Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
4	September 08-12, 2024	Oryx Meeting Room, Doubletree By Hilton Doha-Al Sadd, Doha, Qatar
5	November 17-21, 2024	Al Aziziya Hall, The Proud Hotel Al Khobar, Al Khobar, KSA
6	December 08-12, 2024	Oryx Meeting Room, Doubletree By Hilton Doha-Al Sadd, Doha, Qatar

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. 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 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, Advanced Petrophysics/Interpretation of Cased Hole Logs, Cased Hole Formation Evaluation, 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, 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, Cased Hole 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 course 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 & Introductions</i>
0815 – 0830	PRE-TEST
0830 – 0930	Fracture Reservoir <i>Definition • Origin</i>
0930 – 0945	<i>Break</i>
0945 – 1100	Fracture Reservoir (cont'd) <i>Classification • Character</i>
1100 – 1200	Hydrocarbon Reservoir Properties <i>Definition</i>
1200 – 1215	<i>Break</i>
1215 – 1420	Hydrocarbon Reservoir Properties (cont'd) <i>Petrophysical Characters</i>
1420 – 1430	Recap
1430	<i>Lunch & End of Day One</i>

Day 2

0730 – 0930	Hydrocarbon Reservoir Properties (cont'd) <i>Geological Aspects</i>
0930 – 0945	<i>Break</i>
0945 – 1100	Carbonate Rock <i>Definition • Origin</i>
1100 – 1200	Carbonate Rock (cont'd) <i>Classification</i>
1200 – 1215	<i>Break</i>
1215 – 1420	Carbonate Rock (cont'd) <i>Geological Aspects</i>
1420 – 1430	Recap
1430	<i>Lunch & End of Day Two</i>



Day 3

0730 – 0930	Carbonate Rock (cont'd) <i>Petrophysical Character</i>
0930 – 0945	<i>Break</i>
0945 – 1100	Reservoir Modeling <i>Definition • Purpose</i>
1100 – 1200	Reservoir Modeling (cont'd) <i>Source of Information</i>
1200 – 1215	<i>Break</i>
1215 – 1350	Reservoir Modeling (cont'd) <i>Workflow</i>
1420 – 1430	Recap
1430	<i>Lunch & End of Day Three</i>

Day 4

0730 – 0930	Natural Fracture Reservoir Modeling <i>Introduction</i>
0930 – 0945	<i>Break</i>
0945 – 1100	Natural Fracture Reservoir Modeling (cont'd) <i>Indications of Presence of Fractures in Reservoir</i>
1100 – 1200	Natural Fracture Reservoir Modeling (cont'd) <i>Application of Work Flow</i> <i>Surface Outcrops • Coring Analysis</i>
1200 – 1215	<i>Break</i>
1215 – 1350	Natural Fracture Reservoir Modeling (cont'd) <i>Application of Work Flow (cont'd)</i> <i>Petrophysical Analysis • Coring & Petrophysical Analysis Integration</i>
1420 – 1430	Recap
1430	<i>Lunch & End of Day Four</i>

Day 5

0730 – 0930	Natural Fracture Reservoir Modeling (cont'd) <i>Application of Work Flow (cont'd)</i> <i>Construction Petrophysical Modeling • Geophysical Technology • Construction Geological & Structure Modeling</i>
0930 – 0945	<i>Break</i>
0945 – 1100	Natural Fractures in Field Development
1100 – 1200	Methods for Controlling Short-Term & Long-Term Performance in Fractured Reservoirs
1200 – 1215	<i>Break</i>
1215 – 1330	Case Studies
1345 – 1400	Course Conclusion
1400 - 1415	POST-TEST
1415 – 1430	<i>Presentation of Course Certificates</i>
1430	<i>Lunch & End of Course</i>



Practical Sessions

This practical and highly-interactive course includes real-life case studies and exercises:-



Course Coordinator

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