COURSE OVERVIEW DE0381
Petrel Reservoir Geomechanics

Course Title
Petrel Reservoir Geomechanics

Course Reference
DE0381

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

Course Date/Venue

Session(s)	Date	Venue
1	February 18-22, 2024	Oryx Meeting Room, DoubleTree By Hilton Doha-Al Sadd, Doha, Qatar
2	May 05-09, 2024	
3	September 29-October 03, 2024	
4	November 03-07, 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 Petrel Reservoir Geomechanics. It covers the reservoir geomechanics and its significance in reservoir management; the basic concepts and principles of stress, strain and rock mechanics; the properties and mechanical behavior of rocks; the mechanisms of pore pressure generation and its impact on reservoir behavior; the data requirements for geomechanical studies and integration of geomechanical concepts in Petrel; and the geomechanical models in Petrel and 1D mechanical earth modeling (MEM).

Further, the course will also discuss the stress modeling and analysis, importing and integrating geological data and calibrating geomechanical models; the 3D geomechanical modeling and evaluating the impact of faults and fractures in geomechanical models; predicting and managing wellbore instabilities; the hydraulic fracturing simulation and reservoir compaction and subsidence modeling; the fundamentals of coupled reservoir-geomechanical analysis; and integrating geomechanical models with reservoir simulation.

During this interactive course, participants will learn the impact of geomechanics on fluid flow and predicting and managing reservoir-induced seismicity; optimizing field development plans using geomechanics; the latest advances in reservoir geomechanics; the challenges in shale, tight sands, and other unconventional plays; the risk management and uncertainty analysis in geomechanics; the machine learning and AI in geomechanical modeling; and the potential of advanced data analysis techniques.

Course Objectives

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

- Apply and gain an in-depth knowledge on Petrel reservoir geomechanics
- Explain reservoir geomechanics and its significance in reservoir management including the basic concepts and principles of stress, strain and rock mechanics
- Identify the properties and mechanical behavior of rocks as well as the mechanisms of pore pressure generation and its impact on reservoir behavior
- Recognize the data requirements for geomechanical studies and integration of geomechanical concepts in Petrel
- Develop geomechanical models in Petrel and create and interpret 1D mechanical earth modeling (MEM)
- Illustrate stress modeling and analysis, importing and integrating geological data and calibrating geomechanical models
- Describe the 3D geomechanical modeling evaluate the impact of faults and fractures in geomechanical models
- Predict and manage wellbore instabilities and illustrate hydraulic fracturing simulation and reservoir compaction and subsidence modeling
- Explain the fundamentals of coupled reservoir-geomechanical analysis and integrate geomechanical models with reservoir simulation
- Discuss the impact of geomechanics on fluid flow and predict and manage reservoir-induced seismicity
- Optimize field development plans using geomechanics and review the latest advances in reservoir geomechanics
- Address challenges in shale, tight sands, and other unconventional plays as well as apply risk management and uncertainty analysis in geomechanics
- Illustrate machine learning and AI in geomechanical modeling and discuss the potential of advanced data analysis techniques

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 Petrel reservoir geomechanics for reservoir engineers, geologists, geophysicists, petroleum engineers, geomechanics engineers, asset 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:-

- 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.

- 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.

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 Fees

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.

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 – 0900	***Introduction to Reservoir Geomechanics**: Overview of the Field & Its Significance in Reservoir Management*
0900 - 0930	***Stress & Strain in Reservoirs**: Basic Concepts & Principles of Stress, Strain & Rock Mechanics*
0930 – 0945	*Break*
0945 – 1130	***Rock Properties & Mechanical Behavior**: Elastic, Plastic & Failure Properties of Reservoir Rocks*
1130 – 1230	***Pore Pressure Fundamentals**: Mechanisms of Pore Pressure Generation & Its Impact on Reservoir Behavior*
1230 – 1245	*Break*
1245 - 1300	***Data Requirements for Geomechanical Studies**: Identifying Key Data Types & Sources*
1300 - 1420	***Integration of Geomechanical Concepts in Petrel**: Overview of Petrel's Capabilities in Geomechanics*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0830	***Building Geomechanical Models in Petrel**: Steps & Considerations in Developing Geomechanical Models*
0830 - 0930	***1D Mechanical Earth Modeling (MEM)**: Creating & Interpreting 1D MEMs in Petrel*
0930 – 0945	*Break*
0945 – 1130	***Stress Modeling & Analysis**: Techniques for Modeling Stress Distributions & Orientations*
1300 – 1230	***Importing & Integrating Geological Data**: Utilizing Geological Models & Data for Geomechanical Analysis*
1230 – 1245	*Break*
1245 - 1300	***Calibrating Geomechanical Models**: Matching Model Predictions with Observed Data*
1300 - 1420	***Case Studies**: Real-World Examples of Geomechanical Modeling in Petrel*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0830	***3D Geomechanical Modeling**: Extending 1D MEMs to 3D*
0830 - 0930	***Fault & Fracture Analysis in Geomechanical Models**: Evaluating the Impact of Faults & Fractures*
0930 – 0945	*Break*
0945 – 1130	***Wellbore Stability Analysis**: Predicting & Managing Wellbore Instabilities*
1300 – 1230	***Hydraulic Fracturing Simulation**: Modeling Fracture Propagation & Interactions*
1230 – 1245	*Break*
1245 - 1300	***Reservoir Compaction & Subsidence Modeling**: Understanding & Predicting Compaction & Subsidence Effects*
1300 - 1420	***Workshop**: Hands-On Session on Advanced Geomechanical Analysis in Petrel*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

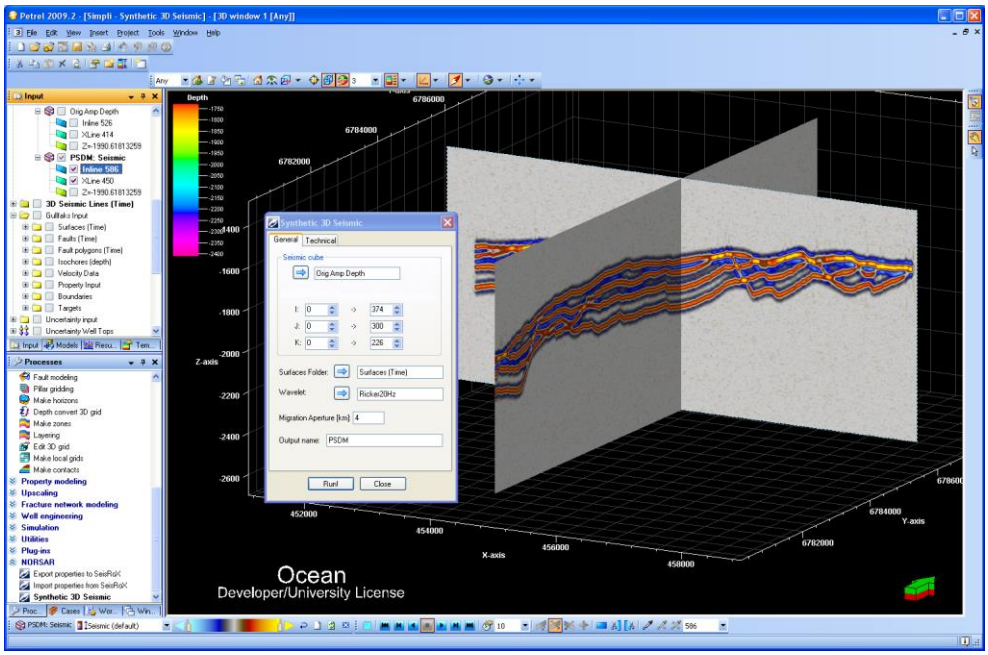
0730 – 0830	***Fundamentals of Coupled Reservoir-Geomechanical Analysis**: Principles & Benefits of Coupled Modeling*
0830 - 0930	***Integrating Geomechanical Models with Reservoir Simulation**: Workflow & Techniques for Integration*
0930 – 0945	*Break*
0945 – 1130	***Impact of Geomechanics on Fluid Flow**: How Geomechanics Affects Reservoir Performance & Recovery*
1300 – 1230	***Predicting & Managing Reservoir-Induced Seismicity**: Understanding the Causes & Mitigation Strategies*
1230 – 1245	*Break*
1245 - 1300	***Optimizing Field Development Plans Using Geomechanics**: Applying Geomechanical Insights for Field Development*
1300 - 1420	***Group Project**: Developing a Coupled Reservoir-Geomechanical Model*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

0730 – 0830	***Latest Advances in Reservoir Geomechanics**: Reviewing Recent Technological & Methodological Developments*
0830 - 0930	***Geomechanics in Unconventional Reservoirs**: Addressing Challenges in Shale, Tight Sands & Other Unconventional Plays*
0930 – 0945	*Break*
0945 – 1130	***Risk Management & Uncertainty Analysis in Geomechanics**: Approaches for Handling Uncertainties*
1130 – 1230	***Machine Learning & AI in Geomechanical Modeling**: Exploring the Potential of Advanced Data Analysis Techniques*
1230 – 1245	*Break*
1245 – 1345	***Case Studies in Advanced Geomechanical Applications**: Examining Complex Geomechanical Challenges & Solutions*
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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