COURSE OVERVIEW DE0529
Prediction of Subsurface Pressures in Drilling Engineering

Course Title
Prediction of Subsurface Pressures in Drilling Engineering

Course Date/Venue
Session 1: July 06-10, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
Session 2: December 08-12, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference
DE0529

Course Duration
Five days

Course Description


This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using one of our state-of-the-art simulators.

This course is designed to provide participants with a detailed and up-to-date overview of Prediction of Subsurface Pressures in Drilling Engineering. It covers the importance of predicting subsurface pressures including its types and effects of pressure variations on wellbore stability; the types of formation pressures and their significance; the overburden pressure and stress distribution; the pore pressure prediction techniques and the causes of overpressure and under pressure; the normal, subnormal and overpressure zones; and the well control and kick detection, geological indicators of formation pressure and direct measurement of formation pressures.

Further, the course will also discuss the indirect methods for pressure estimation, well logs for pore pressure estimation and drilling data for pressure prediction; the fracture gradient and breakdown pressure; the methods for estimating fracture gradient and wellbore stability and mud weight optimization; the safe mud weight and pressure margins; the calculation of kick tolerance for well control; and managing narrow pressure windows in HPHT wells.

During this interactive course, participants will learn the real-time pressure monitoring systems, managed pressure drilling (MPD) and its benefits and early kick detection techniques; the characterization of high-pressure high-temperature (HPHT) reservoirs; the well control techniques for abnormal pressure zones; the impact of overpressure on casing and cementing; the MPD techniques for pressure control and underbalanced drilling for overpressured reservoirs; the lost circulation and wellbore strengthening techniques; and the pressure testing and leak-off test interpretation.

Course Objectives

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

- Apply and gain an in-depth knowledge on prediction of subsurface pressures in drilling engineering
- Discuss the importance of predicting subsurface pressures including its types and effects of pressure variations on wellbore stability
- Identify the types of formation pressures and their significance as well as overburden pressure and stress distribution
- Carryout pore pressure prediction techniques and identify the causes of overpressure and underpressure including normal, subnormal and overpressure zones
- Apply well control and kick detection, geological indicators of formation pressure and direct measurement of formation pressures
- Employ indirect methods for pressure estimation, well logs for pore pressure estimation and drilling data for pressure prediction
- Recognize fracture gradient and breakdown pressure as well as apply methods for estimating fracture gradient and wellbore stability and mud weight optimization
- Define safe mud weight and pressure margins, calculate kick tolerance for well control and manage narrow pressure windows in HPHT wells
- Implement real-time pressure monitoring systems, discuss managed pressure drilling (MPD) and its benefits and apply early kick detection techniques
- Characterize high-pressure high-temperature (HPHT) reservoirs and apply well control techniques for abnormal pressure zones
- Explain the impact of overpressure on casing and cementing and carryout MPD techniques for pressure control and underbalanced drilling for overpressured reservoirs
- Employ lost circulation and wellbore strengthening techniques including pressure testing and leak-off test interpretation

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 aims to provide a common understanding of prediction of subsurface pressures in drilling engineering for drilling supervisors and managers, drilling engineers, wellbore integrity engineers, reservoir engineers, mud engineers (drilling fluids engineers), geologists and geophysicists, petroleum engineers and service company personnel.

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.

Accommodation

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

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.

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:

Dr. Chris Kapetan, PhD, MSc, is a **Senior Drilling & Petroleum Engineer** with over **40 years** of international experience within the **onshore** and **offshore oil** & **gas** industry. His wide experience covers **Horizontal & Multilateral Wells**, **Well Completion & Stimulation**, **Artificial Lift System Selection & Design**, **Drilling Practices**, **Drilling Fluids Technology**, Drilling **Operations**, **Directional** Drilling**, Formation Damage** Evaluation & Preventive, **Formation Damage** Remediation, **Drilling & Formation Damage**, Simulation Program for The **International Petroleum Business**, **Well** Testing & Analysis, **Well** Design, **Well** Testing & Oil Well Performance, **Well** Test Design Analysis, **Well Test** Operations, **Well Testing & Perforation**, Root Cause Analysis (**RCA**), RCA Method for Process Plant, **RCA** Techniques, Control Well-Flow Lines Parameters, Decision Analytic Modelling Methods for **Economic Evaluation**, **Probabilistic Risk Analysis** (**Monte Carlo Simulator**) **Risk Analysis** Foundations, Sulphur, Sour Natural Gas, **Natural Gas Sweeting**, **Petroleum Production**, Field Layout, **Production** Techniques & Control, **Surface Production** Operations, **Project Risk Analysis**, **Feasibility Analysis** Techniques, **Capital Operational Costs**, **Flowmetering & Custody Transfer** and **Oil Refinery**. Further, he is also well-versed in Enhanced Oil Recovery (**EOR**), Electrical Submersible Pumps (**ESP**), **Oil Industries Orientation**, **Geophysics**, **Cased Hole** Formation Evaluation, **Cased Hole** Applications, **Cased Hole** Logs, **Production Wells** Operations, **Production** Management, **Perforating** Methods & Design, **Perforating** Operations, **Fishing** Operations, **Well & Reservoir** Testing, **Reservoir** Stimulation, **Hydraulic Fracturing**, **Carbonate** Acidizing, **Sandstone** Acidizing, **Drilling Fluids** Technology, Drilling Operations, **Directional** Drilling, **Artificial Lift**, **Gas Lift Design**, **Gas Lift** Operations, Petroleum Business, **Petroleum Economics**, Field Development Planning, **Gas Lift Valve** Changing & Installation, **Well Completion** Design & Operation, **Well** Surveillance, **Well** Testing, **Well** Stimulation & Control and **Workover** Planning, Completions & Workover, **Rig Sizing**, **Hole Cleaning & Logging**, **Well Completion**, **Servicing & Work-Over** Operations, Practical **Reservoir Engineering**, **X-mas Tree & Wellhead** Operations, Maintenance & Testing, Advanced **Petrophysics/Interpretation** of **Well Composite**, **Construction Integrity** & **Completion**, **Coiled Tubing** Technology, **Corrosion Control**, **Slickline**, **Wireline & Coil Tubing**, **Pipeline Pigging**, **Corrosion** Monitoring, **Cathodic Protection** as well as Root Cause Analysis (**RCA**), Root Cause Failure Analysis (**RCFA**), **Gas Conditioning & Process Technology**, **Production Safety** and **Delusion of Asphalt**. Currently, he is the **Operations Consultant** & the **Technical Advisor** at **GEOTECH** and an independent **Drilling Operations Consultant** of various engineering services providers to the international clients as he offers his expertise in many areas of the **drilling & petroleum discipline** and is well **recognized & respected** for his process and procedural expertise as well as ongoing participation, interest and experience in continuing to promote technology to producers around the world.

Throughout his long career life, Dr. Chris has worked for many international companies and has spent several years **managing** technically **complex wellbore interventions** in both **drilling** & **servicing**. He is a **well-regarded** for his **process** and **procedural expertise**. Further, he was the **Operations Manager** at **ETP Crude Oil Pipeline Services** where he was fully responsible for optimum operations of crude oil pipeline, **workover** and **directional drilling**, **drilling rigs** and equipment, drilling of various geothermal deep wells and **exploration wells**. Dr. Chris was the **Drilling** & **Workover Manager** & **Superintendent** for **Kavala Oil** wherein he was responsible for supervision of **drilling** operations and **offshore exploration**, quality control of performance of **rigs**, **coiled tubing**, **crude oil** transportation via pipeline and abandonment of **well** as per the API requirements. He had occupied various key positions as the **Drilling Operations Consultant**, **Site Manager**, **Branch Manager**, **Senior Drilling** & **Workover Manager** & **Engineer**, **Drilling** & **Workover Engineer**, **Process Engineer**, **Operations Consultant** and **Technical Advisor** in several petroleum companies responsible mainly on an **offshore** sour oil field (under water flood and gas lift) and a gas field. Further, Dr. Chris has been a **Professor** of the **Oil Technology College**.

Dr. Chris has **PhD** in **Reservoir Engineering** and a **Master's** degree in **Drilling & Production Engineering** from the **Petrol-Gaze Din Ploiesti University**. Further, he is a **Certified Surfaced BOP Stack Supervisor** of **IWCF**, a **Certified Instructor/Trainer**, a **Certified Trainer/Assessor/Internal Verifier** by the **Institute of Leadership & Management** (**ILM**) and has conducted numerous short courses, seminars and workshops and has published several technical books on **Production Logging**, **Safety Drilling Rigs** and **Oil Reservoir**.

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 - 0745	*Registration & Coffee*
0745 - 0800	*Welcome & Introductions*
0800 - 0815	***PRE-TEST***
0815 - 0845	***Introduction to Subsurface Pressures in Drilling*** *Importance of Predicting Subsurface Pressures • Types of Subsurface Pressures (Pore Pressure, Fracture Pressure, Overburden Pressure) • Effects of Pressure Variations on Wellbore Stability • Case Studies of Pressure-Related Well Failures*
0845 - 0945	***Types of Formation Pressures & Their Significance*** *Hydrostatic Pressure and Its Calculation • Pore Pressure and Overpressure Mechanisms • Fracture Pressure and Wellbore Integrity • Formation Breakdown and Induced Fracturing*
0945 - 1000	*Break*
1000 - 1115	***Overburden Pressure & Stress Distribution*** *Definition and Calculation of Overburden Pressure • Vertical and Horizontal Stress Components • Impact of Lithology on Stress Distribution • Case Studies of Overburden Stress Failures*
1115 - 1230	***Pore Pressure Prediction Techniques*** *Direct and Indirect Methods of Pore Pressure Prediction • Wireline Logging and Formation Pressure Tests • Mud Logging and Gas Analysis for Pressure Trends • Case Study: Abnormal Pore Pressure in a Deep Offshore Well*
1230 - 1245	*Break*
1245 - 1330	***Normal vs. Abnormal Pressure Regimes*** *Causes of Overpressure and Underpressure • Identification of Normal, Subnormal, and Overpressure Zones • Pressure Transition Zones and Their Challenges • Case Study: Overpressure in Carbonate Reservoirs*
1330 - 1420	***Well Control & Kick Detection*** *Basics of Well Control and Kick Prevention • Causes of Well Kicks and Their Warning Signs • Relationship Between Pore Pressure and Blowouts • Well Control Best Practices*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day One*

Day 2

0730 – 0830	***Geological Indicators of Formation Pressure*** *Role of Geology in Pressure Prediction • Structural Traps and Overpressure Zones • Depositional Environment and Compaction Effects • Case Study: Pressure Trends in Offshore Fields*
0830 - 0930	***Direct Measurement of Formation Pressures*** *Formation Testing While Drilling (FTWD) • Drill Stem Testing (DST) for Pressure Measurement • Wireline Formation Testers (RFT, MDT) • Advantages and Limitations of Direct Pressure Measurements*
0930 - 0945	*Break*

0945 - 1130	***Indirect Methods for Pressure Estimation*** *Sonic Log and Resistivity-Based Pressure Prediction • Density Logs and Empirical Correlations • Seismic Velocities and Interval Transit Time Method • Approach to Integrated Pressure Prediction*
1130 – 1230	***Well Logs for Pore Pressure Estimation*** *Resistivity and Sonic Log Interpretation • Porosity Logs and Their Application in Pressure Analysis • Gamma Ray Logs and Lithology Identification • Cross-Plotting Techniques for Pressure Estimation*
1230 - 1245	*Break*
1245 - 1330	***Drilling Data for Pressure Prediction*** *Monitoring Drilling Parameters for Pressure Detection • Mud Gas Analysis and Its Relation to Pore Pressure • Rate of Penetration (ROP) and Overpressure Indicators • Case Study: Sudden Pressure Spike Detection in a HPHT Well*
1330 - 1420	***Advanced Pressure Prediction Software & Models*** *AI and Machine Learning in Pressure Prediction • Real-Time Pressure Monitoring Systems • Software Tools (Petrel, Drillworks, Geolog) • Digital Initiatives for Pressure Prediction*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Two*

Day 3

0730 – 0830	***Understanding Fracture Gradient & Breakdown Pressure*** *Definition of Fracture Gradient and Its Importance • Factors Affecting Fracture Pressure • Estimation of Fracture Gradient Using Log Data • Case Study: Fracture Gradient Challenges in Tight Sandstones*
0830 - 0930	***Methods for Estimating Fracture Gradient*** *Eaton's Method for Fracture Pressure Calculation • Hubbert & Willis Method for Pressure Estimation • Application of Leak-Off Tests (LOT) • Calibrating Fracture Pressure with Wellbore Observations*
0930 - 0945	*Break*
0945 - 1100	***Wellbore Stability & Mud Weight Optimization*** *Impact of Pressure Variation on Wellbore Stability • Mud Weight Selection for Balanced Drilling • Wellbore Collapse and Fracturing Risks • Strategies for Preventing Wellbore Instability*
1100 - 1230	***Kick Tolerance & Safe Drilling Margins*** *Defining Safe Mud Weight and Pressure Margins • Calculating Kick Tolerance for Well Control • Managing Narrow Pressure Windows in HPHT Wells • Guidelines for Well Kick Prevention*
1230 - 1245	*Break*
1245 - 1330	***Case Studies on Wellbore Stability Failures*** *Case Study: Wellbore Collapse Due to Poor Pressure Estimation • Case Study: Lost Circulation Issues in Fractured Formations • Lessons Learned from High Pressure Drilling Incidents • Best Practices for Pressure Management in Drilling*

1330 - 1420	***Real-Time Pressure Monitoring & Control*** *Implementation of Real-Time Pressure Monitoring Systems • Managed Pressure Drilling (MPD) and Its Benefits • Early Kick Detection Techniques • Role of AI and Automation in Pressure Prediction*
1420 - 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Three*

Day 4

0730 - 0830	***Drilling in High-Pressure High-Temperature (HPHT) Environments*** *Characteristics of HPHT Reservoirs • HPHT Well Planning and Risk Mitigation • Mud Weight Selection for HPHT Wells • Case Study: HPHT Well Drilling in the Arabian Gulf*
0830 – 0930	***Well Control Techniques for Abnormal Pressure Zones*** *Blowout Prevention and BOP Design • Well Control Methods (Driller's Method, Wait and Weight) • Managing Gas Kicks and Wellbore Stability • Well Control Training and Simulations*
0930 - 0945	*Break*
0945 - 1100	***Impact of Overpressure on Casing & Cementing*** *Casing Seat Selection Based on Pore and Fracture Pressure • Cementing Strategies for Pressure Control • Well Integrity Challenges in Overpressured Zones • Approach to Casing Design for High-Pressure Wells*
1100 - 1230	***Managed Pressure Drilling (MPD) & Underbalanced Drilling (UBD)*** *MPD Techniques for Pressure Control • Underbalanced Drilling for Overpressured Reservoirs • Advantages and Limitations of MPD and UBD • Case Study: MPD Success in Deep Wells*
1230 - 1245	*Break*
1245 - 1330	***Lost Circulation & Wellbore Strengthening Techniques*** *Causes and Detection of Lost Circulation • Lost Circulation Material (LCM) Selection • Wellbore Strengthening Techniques to Control Losses • Case Study: Mitigating Losses in Fractured Carbonates*
1330 - 1420	***Pressure Testing & Leak-Off Test Interpretation*** *Conducting Leak-Off and Formation Integrity Tests (FIT) • Interpretation of Test Results for Pressure Gradient Estimation • Pressure Testing Best Practices for Deepwater Wells • Standard Operating Procedures for Pressure Tests*
1420 - 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Four*

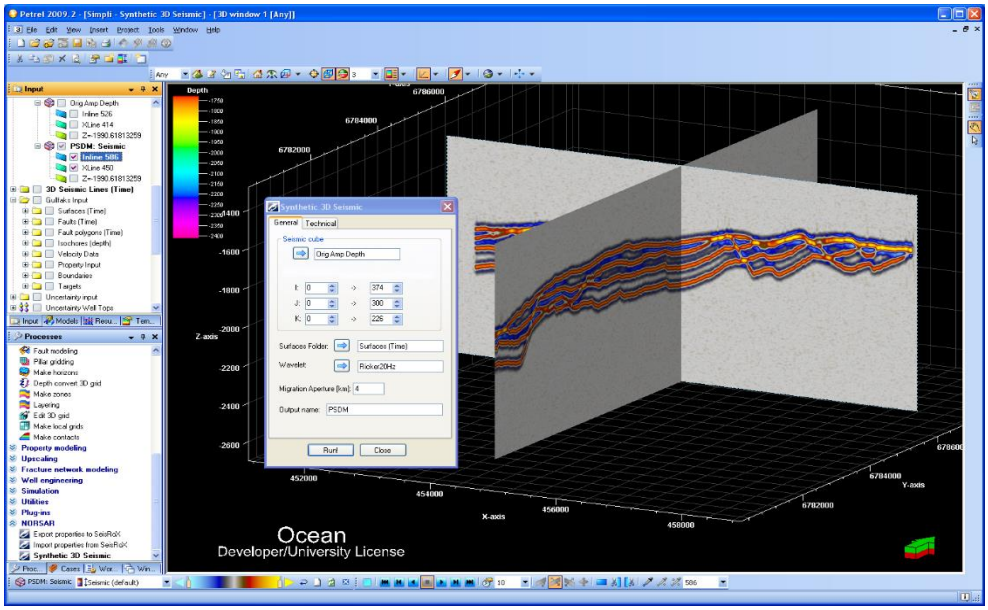
Day 5

0730 - 0930	***Specific Challenges in Pressure Prediction***
0930 - 0945	*Break*
0945 - 1100	***Group Exercise: Pressure Prediction for a New Well Design***
1100 - 1230	***Real-Time Data Analysis & Decision Making***
1230 - 1245	*Break*

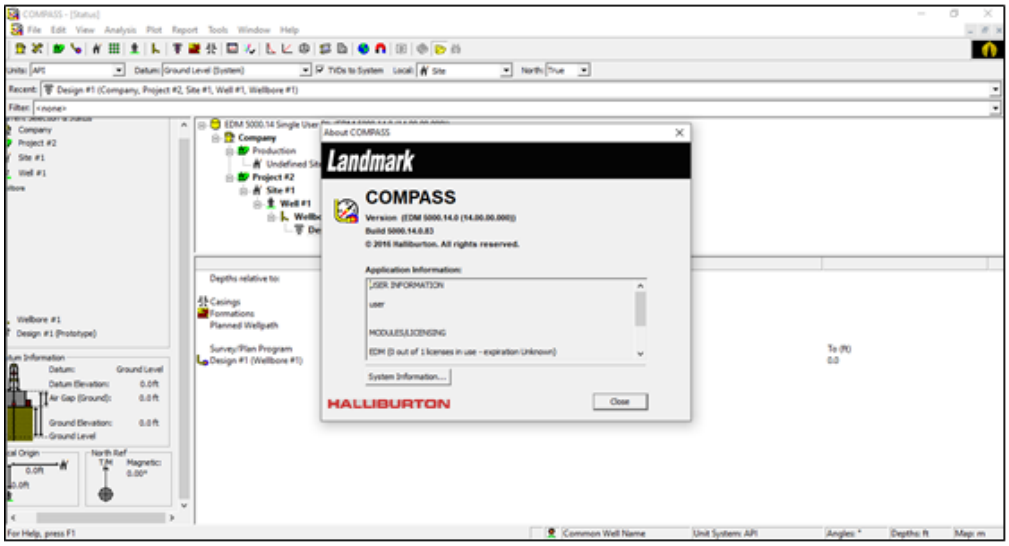
1245 - 1345	***Hands-On Software Training for Pressure Prediction***
1345 – 1400	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course*
1400 - 1415	***POST-TEST***
1415 - 1430	*Presentation of Certificates*
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" and "COMPASS" software.



Petrel Software



COMPASS

Course Coordinator

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