COURSE OVERVIEW DE0610
Advanced Drilling Technology

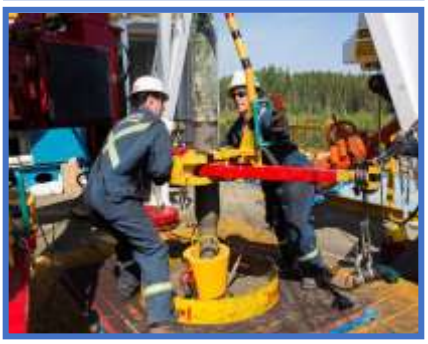
Course Title
Advanced Drilling Technology

Course Date/Venue
Session 1: July 06-10, 2025/Meeting Plus 8, City Centre Rotana Doha Hotel, Doha, Qatar
Session 2: November 16-20, 2025/ Meeting Plus 8, City Centre Rotana Doha Hotel, Doha, Qatar

Course Reference
DE0610

Course Duration/Credits
Five days/2.825 CEUs/28.25 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 advanced drilling technologies. It covers the advanced drilling techniques for horizontal drilling, multilateral drilling, extended reach drilling and complex path drilling; the directional drilling and ERD and the various types of directional wells; the extended reach drilling (ERD) and the condition of ERD wells; the dogleg severity, survey calculations and accuracy covering directional well design, well path calculation and well surveying; the conveyance-down and out in the oil field; and improving hole cleaning on high angle wells.

During this interactive course, participants will learn the multilateral drilling and completion technology based on solid expandable tubular fixing system; the underbalanced drilling technology and the regulatory barriers to underbalance drilling; the air drilling, air drilling dusting, air drilling benefits and air/dust drilling layout; the deflection tools and techniques including torque and drag calculations; and the drilling cementing, types of cementing processes and cementing problems.

Course Objectives

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

- Apply and gain an advanced knowledge on drilling technologies
- Carryout advanced drilling techniques for horizontal drilling, multilateral drilling, extended reach drilling and complex path drilling
- Discuss directional drilling and ERD and identify the various types of directional wells
- Explain extended reach drilling (ERD) and the condition of ERD wells
- Recognize dogleg severity and apply survey calculations and accuracy covering directional well design, well path calculation and well surveying
- Discuss conveyance-down and out in the oil field and improve hole cleaning on high angle wells
- Explain multilateral drilling and completion technology based on solid expandable tubular fixing system
- Discuss underbalanced drilling technology and the regulatory barriers to underbalance drilling
- Identify air drilling, air drilling dusting, air drilling benefits and air/dust drilling layout
- Carryout deflection tools and techniques including torque and drag calculations
- Recognize drilling cementing, types of cementing processes and cementing problems

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 advanced drilling technology for drilling engineers, drilling engineering supervisors, drilling operations section leaders, tool pushers, managers, well engineers and technical support personnel.

Course Certificate(s)
Internationally recognized certificates will be issued to all participants of the course.

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 **2.825 CEUs** (Continuing Education Units) or **28.25 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 Fee
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.

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 (**Christos Kapetanios**), PhD, MSc, BSc, is a **Senior Drilling & Process Engineer** with over **40 years** of international experience within the **onshore** and **offshore oil and gas** industry. His wide experience covers **Asset Operational Integrity** for Operations, **Process Plant** Operations, Control & Troubleshooting, **Plant Shutdown** System & **Flare** Systems, **Heat Exchangers & Fired Heaters** Operation & Troubleshooting, **Gas Conditioning**, Treatment & Processing Technology, **Production Operations** in the Oil & Gas Fields & **Surface Facilities**, **LNG Process**, **Applied Process** Engineering Elements, **Production Control** Systems, Well Commissioning & Crude Oil Specifications, **Hydrogenation** & **Gasification** Technology, **Physical** & **Chemical** Solvents, Sulfide Stress Cracking (**SSC**), Hydrogen Induced Cracking (**HIC**), **Corrosion**, Steels & Alloys, **Fertilizer Manufacturing** Process Technology, **Fertilizer Storage** Management (Ammonia & Urea), **Process Calculation Methods**, **Directional Planning**, **Completion Design**, **Directional Surveying**, **Drilling Fluids**, **Matrix Acidizing**, **Hydraulic Fracturing**, **Well Completion** Design & Operation, **Cased Hole Formation Evaluation**, **Cased Hole Logs**, **Production** Management, **Drilling Operations**, **Directional Drilling**, **Gas Lift** Operations, **Petroleum Business**, **Petroleum Economics**, **Gas Lift Valve** Changing & Installation, **Horizontal & Multilateral Wells**, **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**, **Wireline & Coil Tubing**, **Pipeline Pigging**, **Corrosion Monitoring**, **Cathodic** Protection, Root Cause Analysis (**RCA**), Root Cause Failure Analysis (**RCFA**), **Production Safety** and **Delusion of Asphalt**. Currently, he is the **Operations Manager** 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 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. 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 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**.

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.

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 – 0930	***Advanced Drilling Techniques*** *Horizontal Drilling, Multilateral Drilling, Extended Reach Drilling, Complex Path Drilling • Applications of Directional Drilling • Types of Directional Well Profile • Survey Measurement • Down-hole Components • Surface Equipment • Measurement While Drilling (MWD)*
0930 – 0945	*Break*
0945 – 1130	***Advanced Drilling Techniques (cont'd)*** *Mud Pulse Telemetry • Survey Instruments • Geosteering • Formation Evaluation Measurements • Surveying Calculations • Tangential Method • Average Angle Method • Directional Problem • Dogleg Calculation • Whipstock • Theory of Operation*
1130 – 1230	***Directional Drilling & ERD*** *Definition • What are Directional Wells • Types of Directional Wells • Why Drill Directionally • Planning a Directional Well • How to Drill Directionally • Horizontal Drilling • Video • How to Do Horizontal Directional Drilling Calculation Planning • Exercise – 2 • Solution • Example – 1: Design of Directional Well • Build Selection*
1230 – 1245	*Break*

1245 – 1420	***Directional Drilling & ERD (cont'd)*** *M = MD Vert. + MD Build + MD Hold • Procedure – Find • Solve • Direction Drilling • Directional Tools • Exercise – 3: Considering Bed Dips • Complex Wells • Directional Drilling Terminologies AZIMUTH • Exercise – 4: • Quizz – 2 • Solution Quizz – 2 • Quiz – 3 • Solution Quiz – 3 • Quiz – 4 • Solution Quiz – 4*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0930	***Extended Reach Drilling (ERD)*** *What is ERD Oil? • What is Condition of ERD Wells? • What is Complex Path Drilling • How is Directional Drilling Done? • What is Extended Reach Drilling Explain with Diagram • Five Most Common Drilling Methods Used in Oil & Gas Exploration • Why is Horizontal Drilling Better? • Video • Planning & Conducting an ERD Program*
0930 – 0945	*Break*
0945 – 1130	***Extended Reach Drilling (ERD) (cont'd)*** *Three Major Technology Breakthrough • Main Applications • Directional Wells are Commonly Drilled • Geological Side Tracking • Onshore Operations • Offshore Operations • Relief Well Drilled Directionally • Terminology • Main Trajectories • Build-Rate Classification (Tentative) • Variables for Survey Calculations • Need for Measurements • Use of Measurements • Main Parameters to Measure • Measurement of Directional & Formation Evaluation Parameters • Measurement of Directional & Formation Evaluation Parameters Real Time Tools*
1130 – 1230	***Extended Reach Drilling (ERD) (cont'd)*** *Transmission • Telemetry – New Technologies • Different Measurement with a MWD and /or a LWD • Control of the Trajectory – General Principle • Deployment of Tools & Technologies for Directional • Positive – Displacement Motor (PDM) Components • Typical Steerable Motors Configuration • Deployment of Tools & Technologies for Directional Drilling Bend Sub • Deployment of Tools & Technologies for Directional Drilling • Horizontal Well – Profiles • Example of a Horizontal Gas Development*
1230 – 1245	*Break*
1245 – 1420	***Dogleg*** *What is Dogleg Severity? • What is Maximum Dogleg Severity? • What are Problems Resulted in because of Severe Dogleg • Dog Leg Severity (DLS) • Converting Between AZIMUTHS & Bearing*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0930	***Survey Calculations & Accuracy*** *Directional Well Design • Application • Directional Well Types • Planning the Well Profile • Parameters Defining the Well Path • Target & Geography • Defining the Well Path • Well Path Calculation • Build-Hold & Drop • Directional Drilling Tools • Well Surveying • Surveying Tools • Surface Locations & Targets • Planning the Well Path • Trajectory Calculations • Directional Survey Calculations • Well Path • Drill String Design (Limitations) • Scenario of Vertical Drilling • References • Appendix 1*
0930 – 0945	*Break*
0945 – 1130	***Conveyance-Down & Out in the Oil Field*** *Holding On or Cutting the Wire*
1130 – 1230	***Improving Hole Cleaning on High Angle Wells*** *Problem Statement • Objectives & Scope of Study • Significance of the Study • Bingham Model • Power Law Model • Cutting Size • Cutting Shape • Angle of Inclination • Annular Velocity • Tools & Equipment Required • Advantages of Using CFD Modelling • Procedure of Modeling Using GAMBIT 2.2.30 Software • Results & Discussion • Conclusion & Recommendations*
1230 – 1245	*Break*
1245 – 1420	***Multilateral Drilling & Completion Technology Based on Solid Expandable Tubular Fixing System***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

0730 – 0930	***Underbalanced Drilling Technology*** *UB Drilling – Jobs • Underbalanced Drilling in the United States • UBD Definition • UBD – Types • Barriers to UB Drilling • Regulatory Barriers to UnderBalance Drilling • Barriers to UB D&C • Operators Barriers • Operators Problems • Reasons for UB Growth*
0930 – 0945	*Break*
0945 – 1130	***Underbalanced Drilling Technology (cont'd)*** *UBD Forecast by Region • Technical Improvements • Reasons for UB Drilling • Effect of Skin on Production Rates • Physical Limitations to UBD • Production Limits to UBD • Types of Flow Regimes • Generalized "Fluid" Systems • Equipment – Rotating Head • Closed Loop Circulation System • Equipment – Gas Source*
1130 – 1230	***Air Drilling*** *Air Drilling • Air Drilling Dusting • Air Drilling Benefits • Air/Dust Drilling Layout • Misting • Foam Drilling – Basic Comments • Foam Drilling • Foam (Heading) • Improved Hole Cleaning • Foam Drilling Benefits • Mist or Foam Drilling Layout • Gaseated or Aerated Drilling • Aerated Fluid • Parasite String • Aerated Fluid Layout • Aerated Drilling Problems*
1230 – 1245	*Break*

1245 – 1420	***Deflection Tools & Techniques*** *Natural Formation Effects • Drill Collars • Heavy-Weight Drill Pipe (HWDP) • Stabilizers • Roller Reamers • Forces Acting on the Bit • Rotary Assemblies • Building Assembly • Holding Assemblies • Dropping Assemblies • Deflecting Tools • Whipstocks • Jet Deflection • Rebel Tool • Downhole Motor & Bent Sub • Downhole Turbines • Orientation of Deflecting Tools • Toolface Setting • Orienting Procedure • Specialized Deflection Techniques • Curved Conductors • Slant Hole Drilling • Questions*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

0730 - 0815	***Torque & Drag Calculations*** *Friction – Stationary • Sliding Motion • Frictionless, Inclined, Straight Wellbore: • Effect of Friction (No Doglegs) • Problem 1 • Solution • Problem 2 • Problem 2 – Solution – Force • Problem 2 – Equation – Horizontal*
0815 – 0845	***Torque & Drag Calculations (cont'd)*** *Horizontal – Torque • Problem 3 • Solution to Problem 3 • Solution to Problem 3 – Rotating • Solution to Problem 3 – Lowering • Solution to Problem 3 – Raising • Solution to Problem 3 – Summary • Effect of Doglegs*
0845 – 0900	*Break*
0900 – 1000	***Drilling Cementing*** *Cementing • Types of Cementing Processes • Primary Cementation • Secondary Cementation • Cementing Equipment • Mixing Cement • Wiper Plugs • Cementing Head • Preparation for Cementing Program • Calculation • Successful Cementation • Mixing Cement (Basis is 1 sk. of cmt.) • Rotary Drilling Cementing (Basis is 1 sk. of cmt.) • Problem • Cementing Calculations*
1000 – 1115	***Cementing Problems*** *Problem 1: Poor Displacement of Mud • Plug Flow Cementation • Turbulent Flow Cementation • Problem 3: Bridges Composed of Cement Filter Cake • Problem 4: Swapping Out of Mud & Cement Below Pipe • Problem 5: Flash Setting of Cement • Problem 6: Cement can Shrink & May Fail to Isolate Zones • Problem 7: Permeability of Cement may Cause an Interzonal Flow • Problem 8: Gas Migration May Fail to Isolate Zones • Problem 9: A Micro-Annulus • Problem 10: Temperature Retrograde of Cement • Problem 11: Perforation of Cement Mechanism*
1115 – 1130	***Course Conclusion***
1130 – 1145	***POST-TEST***
1145 – 1200	*Presentation of Course Certificates*
1200	*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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