

COURSE OVERVIEW DE0148

Drilling and Completion - Formation Damage, Stimulation, Sand Control and Water control

Course Title

Drilling and Completion - Formation Damage, Stimulation, Sand Control and Water control

Course Date/Venue

Session 1: February 11-15, 2024/The Mouna Meeting Room, The H Dubai Hotel, Sheikh Zayed Rd - Trade Centre, Dubai, UAE

Session 2: March 03-07, 2024/Kizkulesi, Crown Plaza Istanbul Asia Hotels & Convention Center, Istanbul, Turkey



Course Reference

DE0148

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 formation damage, remediation and well stimulation. It covers the formation damage, field diagnosis and measurement of formation damage; the formation damage and pseudo-damage from well performance; the formation damage control and remediation as well as formation damage mitigation; the reservoir stimulation in petroleum production; and the formation characterization of well and reservoir testing.

During this interactive course, participants will learn the formation characterization of rock mechanics and well logs; the basics and mechanics of hydraulic fracturing; the fracturing fluid chemistry and proppants; the fracturing materials performance, fracture evaluation using pressure diagnostics and fracture treatment design; the fracturing operations, post-treatment evaluation and fractured well performance; the matrix treatments, fundamentals of acid stimulation and carbonate acidizing design; the matrix stimulation treatment evaluation; the causes and effects of sand production; and the sand control in open-hole completions, chemical consolidation methods and water control.

Course Objectives

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

- Apply and gain an in-depth knowledge on formation damage, remediation and well stimulation
- Discuss formation damage, field diagnosis and measurement of formation damage
- Determine, identify characterize and evaluate formation damage and pseudo-damage from well performance
- Describe formation damage control and remediation as well as formation damage mitigation
- Employ reservoir stimulation in petroleum production and recognize the formation characterization of well and reservoir testing
- Identify the formation characterization of rock mechanics and well logs
- Describe the basics and mechanics of hydraulic fracturing as well as the fracturing fluid chemistry and proppants
- Carryout fracturing materials performance, fracture evaluation using pressure diagnostics and fracture treatment design
- Employ fracturing operations, post-treatment evaluation and fractured well performance
- Discuss matrix treatments, fundamentals of acid stimulation and carbonate acidizing design
- Apply matrix stimulation treatment evaluation and recognize the causes and effects of sand production
- Employ sand control in open-hole completions, chemical consolidation methods and water control

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, sample video clips of the instructor’s actual lectures & practical sessions during the course conveniently saved in a **Tablet PC**.

Who Should Attend


This course provides an overview of all significant aspects and considerations of formation damage, remediation and well stimulation for petroleum engineers and petroleum industry professionals who are involved in the important activities of reservoir evaluation, development and management and for those who require invaluable skills in the application of the techniques described for the successful exploitation of oil and gas reservoirs.

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.

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. Konstantin Zorbalas, MSc, BSc, is a Senior Petroleum Engineer & Well Completions Specialist with over 25 years of offshore and onshore experience in the Oil & Gas, Refinery & Petrochemical industries. His wide expertise includes Workovers & Completions, Petroleum Risk & Decision Analysis, Acidizing Application in Sandstone & Carbonate, Well Testing Analysis, Stimulation Operations, Reserves Evaluation, Reservoir Fluid Properties, Reservoir Engineering & Simulation Studies, Reservoir Monitoring, Artificial Lift Design, Gas Operations, Workover/Remedial Operations & Heavy Oil Technology, Applied Water Technology, Oil & Gas Production, X-mas Tree & Wellhead Operations & Testing, Artificial Lift Systems (Gas Lift, ESP, and Rod Pumping), Well Cementing, Production Optimization, Well Completion Design, Sand Control, PLT Correlation, Slickline Operations, Acid Stimulation, Well testing, Production Logging, Project Evaluation & Economic Analysis. Further, he is actively involved in **Project Management** with special emphasis in production technology and field optimization, performing conceptual studies, economic analysis with risk assessment and field development planning. He is currently the **Senior Petroleum Engineer & Consultant of National Oil Company** wherein he is involved in the mega-mature fields in the Arabian Gulf, predominantly carbonate reservoirs; designing the acid stimulation treatments with post-drilling rigless operations; utilizing CT with tractors and DTS systems; and he is responsible for gas production and preparing for reservoir engineering and simulation studies, well testing activities, field and reservoir monitoring, production logging and optimization and well completion design.

During his career life, Mr. Zorbalas worked as a **Senior Production Engineer, Well Completion Specialist, Production Manager, Project Manager, Technical Manager, Technical Supervisor & Contracts Manager, Production Engineer, Production Supervisor, Production Technologist, Technical Specialist, Business Development Analyst, Field Production Engineer and Field Engineer.** He worked for many world-class oil/gas companies such as **ZADCO, ADMA-OPCO, Oilfield International Ltd, Burlington Resources** (later acquired by **Conoco Phillips**), **MOBIL E&P, Saudi Aramco, Pluspetrol E&P SA, Wintershall, Taylor Energy, Schlumberger, Rowan Drilling and Yukos EP** where he was in-charge of the **design and technical analysis** of a gas plant with capacity **1.8 billion m³/yr gas**. His achievements include **boosting oil production 17.2% per year** since 1999 using **ESP and Gas Lift systems**.

Mr. Zorbalas has **Master and Bachelor** degrees in **Petroleum Engineering** from the **Mississippi State University, USA**. Further, he is an **SPE Certified Petroleum Engineer, Certified Instructor/Trainer, a Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management (ILM)**, an active member of the **Society of Petroleum Engineers (SPE)** and has numerous scientific and technical publications and delivered innumerable training courses, seminars 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.

Accommodation

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

Course Fee

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.
Istanbul	US\$ 8,500 per Delegate + VAT . This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

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 & Introduction</i>
0815 – 0830	PRE-TEST
0830 – 0930	Overview of Formation Damage <i>Common Formation Damage Problems, Factors & Mechanisms • Understanding & Mitigation of Formation Damage • Origin of Petroleum-Bearing Formations • Constituents of Sedimentary Rocks • Composition of Petroleum-Bearing Formations • Mineral Sensitivity of Sedimentary Formations • Mechanisms of Clay Swelling • Models for Clay Swelling • Cation Exchange Capacity • Shale Swelling & Stability</i>
0930 – 0945	<i>Break</i>
0945 – 1100	Field Diagnosis & Measurement of Formation Damage <i>Diagnosis and Evaluation of Formation Damage in the Field • Pseudo-Damage vs. Formation Damage • Measures of Formation Damage • Model-Assisted Estimation of Skin Factor • Model-Assisted Analysis of the Near-Wellbore Permeability Alteration Using Pressure Transient Data • Productivity Decline Caused by Mud Invasion into Naturally Fractured Reservoirs • Continuous Real Time Series Analysis for Detection and Monitoring Formation Damage Effects • Formation Damage Expert System</i>

1100 – 1230	<p>Determination of Formation Damage & Pseudo-Damage from Well Performance-Identification, Characterization & Evaluation Completion damage and Flow Efficiency • Formation Damage and Flow Efficiency • Formation Damage Assessment in the Field by Well Surveillance • Well-Testing Techniques, Reservoir Parameters, and Interpretation Methods • Components of the Total Skin Factor • Variable Skin Factor</p>
1230 – 1245	Break
1245 – 1330	<p>Formation Damage Control & Remediation Selection of Treatment Fluids • Clay Stabilization • Clay and Slit Fines • Effect of Drilling Fluids on Shale Stability • Bacterial Damage • Inorganic Scales • Organic Deposits • Mixed Organic/Inorganic Deposits • Formation damage Induced by Completion-Fluids and Crude-Oil Emulsions • Wettability Alteration and Emulsion and Water Blocks • Intense Heat Treatment • Sand Control • Well Stimulation • Recapitalization of the Methods For Formation Damage Mitigation • Sandstone and Carbonate Formation Acidizing • Water Injectivity of Management • Controlling the Adverse Side effects of Remedial Treatments</p>
1330 – 1420	<p>Formation Damage Mitigation Comprehensive Methodology for Mitigation of Formation Damage • Treatment Fluid Application Methods • Thermal and Hydraulic Coupling of Wellbore with Reservoir During Remedial Fluid Treatments Illustrated for Hydraulically Fractured Well Acidizing</p>
1420 – 1430	<p>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</p>
1430	Lunch & End of Day One

Day 2

0730 – 0830	<p>Reservoir Stimulation in Petroleum Production Introduction • Inflow Performance • Alterations in the Near-Wellbore Zone • Tubing Performance & NODAL* Analysis • Decision Process for Well Stimulation • Reservoir Engineering Considerations for Optimal Production Enhancement Strategies • Stimulation Execution</p>
0830 – 0930	<p>Formation Characterization: Well & Reservoir Testing Evolution of a Technology • Pressure Derivative in Well Test Diagnosis • Parameter Estimation from Pressure Transient Data • Test Interpretation Methodology • Analysis with Measurement of Layer Rate • Layered Reservoir Testing • Testing Multilateral & Multibranch Wells • Permeability Determination from a Fracture Injection Test</p>
0930 – 0945	Break
0945 – 1100	<p>Formation Characterization: Rock Mechanics Basic Concepts • Rock Behavior • Rock Mechanical Property Measurement • State of Stress in the Earth • In-situ Stress Management</p>
1100 – 1230	<p>Formation Characterization: Well Logs Depth • Temperature • Properties Related to the Diffusion of Fluids • Properties Related to the Deformation & Fracturing of Rock • Zoning</p>
1230 – 1245	Break

1245 – 1420	Basics of Hydraulic Fracturing Overview of Hydraulic Fracturing • In-Situ Stress • Reservoir Engineering • Rock & Fluid Mechanics • Treatment Pump Scheduling • Economics & Operational Considerations
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	Mechanics of Hydraulic Fracturing History of Early Hydraulic Fracture Modeling • Three-Dimensional & Pseudo-Three-Dimensional Models • Leakoff • Proppant Placement • Heat Transfer Models • Fracture Tip Effects • Tortuosity & Other Near-Well Effects • Acid Fracturing • Multilayer Fracturing • Pump Schedule Generation • Pressure History Matching
0830 – 0930	Fracturing Fluid Chemistry & Proppants Water-Base Fluids • Oil-Base Fluids • Acid-Based Fluids • Multiphase Fluids • Additives • Proppants • Execution
0930 – 0945	Break
0945 – 1100	Performance of Fracturing Materials Fracturing Fluid Characterization • Characterization Basics • Translation of Field Conditions to a Laboratory Environment • Molecular Characterization of Gelling Agents • Rheology • Proppant Effects • Fluids Loss
1100 – 1230	Fracture Evaluation Using Pressure Diagnostics Fundamental Principles of Hydraulic Fracturing • Pressure During Pumping • Analysis During Fracture Closure • Pressure Interpretation After Fracture Closure • Numerical Simulation of Pressure: Combined Analysis of Pumping & Closing • Comprehensive Calibration Test Sequence
1230 – 1245	Break
1245 – 1420	Fracture Treatment Design Design Considerations • Geometry Modeling • Treatment Schedule • Multilayer Fracturing • Acid Fracturing • Deviated Wellbore Fracturing
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	Fracturing Operations Completions • Perforating • Surface Equipment for Fracturing Operations • Bottomhole Pressure Measurement & Analysis • Proppant Flowback Control • Flowback Strategies • Quality Assurance & Quality Control • Health, Safety & Environment
0830 – 0930	Post-Treatment Evaluation & Fractured Well Performance Post-Treatment Fracture Evaluation • Factors Affecting Fractured Well Performance • Well Test Analysis of Vertically Fractured Wells • Prediction of Fractured Well Performance
0930 – 0945	Break

0945 – 1100	Introduction to Matrix Treatments Candidate Selection • Formation Damage Characterization • Stimulation Technique Determination • Treatment Design • Final Economic Evaluation • Execution • Treatment Evaluation
1100 – 1230	Fundamentals of Acid Stimulation Acid-Mineral Interactions • Sandstone Acidizing • Carbonate Acidizing
1230 – 1245	Break
1245 – 1420	Carbonate Acidizing Design Rock & Damage Characteristics in Carbonate Formations • Carbonate Acidizing with Hydrochloric Acid • Other Formulations • Treatment Design
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 – 0830	Matrix Stimulation Treatment Evaluation Derivation of Bottomhole Parameters from Wellhead Measurements • Monitoring Skin Effect Evolution During Treatment • Prouvost and Economides Method • Behenna Method • Inverse Injectivity Diagnostic Plot • Limitations of Matrix Treatment Evaluation Techniques • Treatment Response Diagnosis • Post-Treatment Evaluation
0830 – 0930	Causes & Effect of Sand Production The Geology of Sedimentary Formations • The Nature of Cohesive Failure and Contributing Issues • Terms that Describe Sanding Formations
0930 – 0945	Break
0945 – 1100	Sand Control in Open-Hole Completions Fluids Related to Drill-In (Fluid Loss Control) • Sand Exclusion Devices • Vertical Open-Hole Completions
1100 – 1230	Chemical Consolidation Methods Consolidation Resins Used in Pre-Pack Screens • Epoxy Resin Consolidation Systems • Furan Resin Consolidation Systems
1230 – 1245	Break
1245 – 1345	Water Control Characteristics of Produced Water • Scale Removal • Controlling Scale Using Chemical Inhibitors • Sand & Other Suspended Solids • System Description • Equipment Description & Sizing Skim Tanks & Skim Vessels • Oil/Water/Sediment Coalescing Separators
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 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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