COURSE OVERVIEW DE0371
Artificial Lift and Challenges

Course Title
Artificial Lift and Challenges

Course Date/Venue
October 06-10, 2024/Boardroom, Warwick Hotel Doha, Doha, Qatar

Course Reference
DE0371

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 artificial lift systems. It covers the artificial lift, technology, gas lift design including the criteria for selection of artificial lift system, reservoir performance, natural flow, inflow performance, tubing flow performance and well performance; the artificial lift screening; the components of the electrical submersible system; the installation considerations, cautions, ESP implementation and limitation, design and analysis; and the various types of ESP failure and the causes which can lead to the failure.

During this interactive course, participants will learn to troubleshoot, maintain and monitor ESP and PCP in a professional manner; apply ESP well reservoir and performance review, operation, advanced diagnostic techniques, methods, diagnosis and interpretation; recognize PCP systems; carryout design and optimization of downhole PCP systems; identify the components of beam pump system; employ systematic troubleshooting, maintenance, monitoring and best practices for operation; and illustrate component design, system analysis and pump off controllers.

Course Objectives

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

- Apply and gain a comprehensive knowledge on artificial lift and challenges
- Carryout start up and shutdown as per procedure and identify control instrumentation system for gas lift, ESP wells, beam pumps, PCP wells and plunger lift
- Recognize troubleshooting and sub-surface problems and achieve skills in managing the operational parameters as per safe limits
- Operate the systems without failures and breakdowns and apply correct reporting and proposing
- Apply management of chemicals and corrosion issues and proper leak management as well as update knowledge specific to the system
- Add value to competency by updating knowledge and bridging gaps in the daily operations
- Discuss artificial lift technology, gas lift design including the criteria for selection of artificial lift system, reservoir performance, natural flow, inflow performance, tubing flow performance and well performance
- Illustrate artificial lift screening comprising of method selection, advantages & disadvantages of each method, economic evaluation, technical assessment, ESP, rod pumping and PCP
- Describe all components of the electrical submersible system as well as the installation considerations, cautions, ESP implementation and limitation, design and analysis
- Identify the various types of ESP failure and the causes which can lead to the failure
- Troubleshoot, maintain and monitor ESP and PCP in a professional manner
- Apply ESP well reservoir and performance review, operation, advanced diagnostic techniques, methods, diagnosis and interpretation
- Recognize PCP systems including its components, installation considerations, cautions, implementation and limitation
- Carryout design and optimization of downhole PCP systems as well as discuss PCP reliability theory and data analysis
- Identify the components of beam pump system including its types, design and analysis
- Employ systematic troubleshooting, maintenance, monitoring and best practices for operation
- Illustrate component design, system analysis and pump off controllers

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 artificial lift and challenges for petroleum engineers, production engineers, reservoir engineers, field supervisors, senior plant operators and plant operators who are involved in the selection and design of artificial lift.

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$ 8,500 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 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:

Mr. Victor Saran, MSc, BSc, is a **Senior Drilling & Petroleum Engineer** with over **40 years** of **offshore** & **onshore** experience within the **Oil & Gas** and **Petroleum** industries. His wide expertise covers **Wellhead Testing & Operations**, **Well Stimulation & Reservoir** Management, **Well** Performance, **Well** Servicing, **Well** Killing Procedures, **Well** Completion, **Well** Fracturing, **Well** Testing, **Acid Additives**, **Perforating Techniques**, **Sandstone Acidizing**, **Carbonate Acidizing**, **Acid Fracturing**, **Production** Engineering, **Well** Monitoring & Testing, **Applied Reservoir** Engineering, **Water Flooding**, **Workover & Completions**, **Injection** Systems, **Artificial Lift Systems**, **Gas Lift**, **ESP**, **Rod Pumping**, **Production Testing** & Optimization, **Slickline** and Electric Line Operations, **Perforating & Logging**, **Coiled Tubing** Operations, Nozzles, Motors, Deposits Removal & Inhibition and **Asphaltnes-Sulphates**, Workover Completion, Water Injection & Gas Lift, Nodal Analysis, Drill Stem Testing, H_2S Crude Oil and Oil & Gas Production. Further, he is also well-versed in risk assessments, pipelines construction, pump & loading terminals, material and services procurement, budgeting, contracts & logistics, safety and personnel issues, tendering procedures, budget and work program, cost control–cost recovery, selection of materials and services and quality control. Currently, he is the **Country Manager** of **Energean Oil & Gas** wherein he is responsible in organizing and supervising the drilling of exploration wells and well connections and testing.

During Mr. Saran's life, he has gained his practical and field experience through his various significant positions as the **Completions Consultant**, **Lecturer/Instructors**, **Part-Time Assistant Lecturer**, **Part-Time Instructor**, **Technical Consultant**, **Drilling & Workover Manager**, **Production Manager**, **Production Engineer**, **Petrochemical Engineer**, **Mechanical Engineer**, **Petroleum Services Engineer** for numerous international companies and universities that includes **Lukoil Neftochim**, **J&P Avax**, **Kavala Oil Greece**, **North Aegean Petroleum Company**, **Petrola International**, **Dowell Schlumberger**, **Technological Institute of Kavala**, **University of Thessaloniki** and **University of Crete**.

Mr. Saran has a **Master's & Bachelor's** degree in **Petroleum Engineering** from the **University of Westminster London**, **UK**. Further, he is a **Certified Instructor/Trainer**, a **Certified Trainer/Assessor** by the **Institute of Leadership & Management** (**ILM**) and has conducted numerous trainings, workshops and conferences worldwide.

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: ***Sunday, 06th of October 2024***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Overview of Artificial Lift Technology*** *Introduction ● Criteria for Selection of Artificial Lift System ● Reservoir Performance: Inflow & Outflow Relationships ● Natural Flow ● Inflow Performance ● Tubing Flow Performance ● Well Performance*
0930 – 0945	*Break*
0945 – 1100	***Artificial Lift Screening*** *Method Selection ● Advantages & Disadvantages of Each Method ● Economic Evaluation ● Technical Assessment ● Available Resources & Timeline ● ESP ● Rod Pumping ● PCP*
1100 – 1230	***Gas Lift Design*** *Mandrels ● Valves ● Injection Gas Requirements ● Temperature & Choke Effects*
1230 – 1245	*Break*
1245 – 1420	***Gas Lift Design (cont'd)*** *Equilibrium Curve ● Continuous Flow Design ● Intermittent Flow Design ● Long Perforation Zone Gas Lift Systems*
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: ***Monday, 07th of October 2024***

0730 – 0930	***Electrical Submersible Pumps – ESP*** *Description of all Components of the Electrical Submersible System Starting at the Surface to the Pump; Transformers; Controllers/VSD; Wellhead; Tubing Cable; Cable Guards; Motor Lead Cable; Pump; Intake/Gas Separator; Equalizer/Protector; Motor; Instrumentation ● Installation Considerations & Cautions*
0930 – 0945	*Break*
0945 – 1100	***Electrical Submersible Pumps – ESP (cont'd)*** *ESP Implementation & Limitation ● Design of an ESP System & the Elements which should be Considered during the Design ● Analysis of an ESP System Using Diagnostics from Installed Instrumentation & Using Computer Software*
1100 – 1230	***Electrical Submersible Pumps – ESP (cont'd)*** *Types of ESP Failure & the Causes which could lead to the Failure ● Teardown Analysis of Failed Equipment ● Controls for ESP Systems including Variable Speed Drives*

1230 – 1245	*Break*
1245 – 1420	***Electrical Submersible Pumps – ESP (cont'd)*** *Troubleshooting ESP ● Maintenance & Monitoring*
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: Tuesday, 08th of October 2024

0730 – 0930	***ESP: Well Reservoir & Performance Review*** *Pressure Loss in the Wellbore; Calculation of Density & other Fluid Properties ● Inflow & Outflow; Impact of Changing Well Conditions & Need for Artificial Lift ● Introduction to Pressure Gradient Plots & Use for Artificial Lift Design & Diagnosis*
0930 – 0945	*Break*
0945 – 1100	***ESP Operation*** *Review of Principles of ESP Operation, Head Generation, Impeller Types & Characteristics ● Impact on Well & Reservoir of ESP Operation; Use of Nodal™ Analysis in ESP Applications ● ESP Design Procedure & Sensitivity Analysis; Mechanical & Electrical Considerations*
1100 – 1230	***ESP: Advanced Diagnostic Techniques & Methods*** *Effect of Sand (Wear), Blocking at Intake, Handling Emulsions & High Viscosity Fluids ● ESP Use in Reservoirs with Extreme Temperatures ● Detailed Review of Practical Case Histories of Complex Well & ESP Interactions*
1230 – 1245	*Break*
1245 – 1420	***ESP: Diagnosis & Interpretation*** *Monitoring Past & Present; Review of Electrical (Amp Chart) Interpretation Techniques ● Hydraulic (Pressure) Diagnostic Principles & Use for Validation & Pump Performance Analysis ● ESP Monitoring & Automation with Downhole Sensors ● Data Analysis & Interpretation Examples, Control & Optimization Applications*
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: Wednesday, 09th of October 2024

0730 – 0930	***PCP Systems*** *Description of all Components PCP System (Surface & Down Hole) ● PCP Installation Considerations & Cautions ● PCP Implementation & Limitation*
0930 – 0945	*Break*
0945 – 1100	***PCP Systems (cont'd)*** *Design & Optimization of Downhole PCP Systems ● PCP Reliability Theory & Data Analysis*
1100 – 1230	***PCP Systems (cont'd)*** *Troubleshooting ● Maintenance & Monitoring*
1230 – 1245	*Break*

1245 – 1420	***PCP Systems (cont'd)*** *Application Considerations such as Gas, Solids, High Viscosity Fluids & High Temperatures, Monitoring & Troubleshooting*
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: ***Thursday, 10th of October 2024***

0730 – 0930	***Beam Pumps – BP*** *Description of all Components of the BP System (Surface & Down Hole) ● BP System (Surface & Down Hole) Failures ● Design & Analysis of the Beam Pump System*
0930 – 0945	*Break*
0945 – 1100	***Beam Pumps – BP (cont'd)*** *Description Between Types of BP Units & Down Hole Pumps ● Description of Sucker Rod Types & Implementation ● Implementation & Limitation*
1100 – 1230	***Beam Pumps – BP (cont'd)*** *Troubleshooting ● Maintenance & Monitoring ● Best Practices for Operation*
1230 – 1245	*Break*
1245 – 1345	***Beam Pumps – BP (cont'd)*** *Component Design ● System Analysis ● Pump Off Controllers*
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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