COURSE OVERVIEW DE0348-4D
Artificial Lift Systems

Course Title
Artificial Lift Systems

Course Date/Venue
December 16-19, 2024/Al Aziziya Hall, The Proud Hotel Al Khobar, Al Khobar, KSA

Course Reference
DE0348-4D

2.4 CEUs (24 PDHs) AWARD

Course Duration/Credits
Four days/2.4 CEUs/24 PDHs

Course Description

This practical, highly-interactive course includes real-life case studies where participants will be engaged in a series of interactive small groups and class workshops.

Most of the world's oil wells are placed on some kind of artificial lift, the most significant of which are sucker-rod pumping, gas lifting, and electrical submersible pumping. Production engineers are required to design and operate these installations at their peak efficiencies so as to reach a maximum of profit. To achieve this goal, a perfect understanding of the design of the different lift methods, as well as working skills in the ways ensuring optimum production condition is necessary.

This course first provides an overview of well-performance evaluation leading to determination of well conditions necessitating application of artificial lift. The various types of artificial lift systems along with their selection criteria are then presented. The theoretical and practical aspects of the most important artificial lift methods will be covered, so that at the end of the course the participants will have a sound knowledge of the theory underlying each method as well as an abroad view of the relative advantages, disadvantages, niche of applications and limitations of each artificial lift system.

The course integrates lectures with hands-on exercises. Participants of this course will work with software that allows them to design and analyze artificial lift designs, which will improve performance and results in higher production rates and/or reduced operating costs. Participants will also learn how to design and troubleshoot rod pumping, PCP and ESP systems.

The course also covers other methods such as plunger lift, jet pump and hydraulic pump. Participants are expected to gain experience in solving problems by hand and also by using advanced computer programs. Troubleshooting is an important part of artificial lift operations which will be illustrated in the course covering several typical surveillance problems to be solved.

Course Objectives

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

- Select and design artificial lift systems
- Recognize the principles behind artificial lift systems
- Carryout basic PVT properties and inflow performance (IPR) calculations related to artificial lift (PROSPER)
- Apply multiphase tubing and pipe flow principles
- Select the appropriate articifal lift system
- Compare various artificial lift systems and determine which one is most economically feasible
- Specify components and auxiliary equipment needed for each system
- Design system features that allow for gassy production, production with solids, viscous production and for another harsh environment
- Employ best practices available to extend the life of equipment and lift systems installation
- Apply basic design and analysis concepts
- Analyze inflow and outflow relationships of reservoir performance
- Determine natural flow, inflow performance, tubing flow performance and well performance
- Carryout artificial lift screening and explain the rod-pumping and ESP systems
- Illustrate rod-pump design covering pumping unit, rods, pump, prime movers, gas anchor and pump-off controls and design an SRP system
- Recognize progressive cavity pumps system, applications surface and subsurface equipment
- Determine geometry of downhole pump including power requirement
- Illustrate ESP design comprising of pump performance curves, pump intake curves, typical problems, installation and troubleshooting

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 systems (selection and design) for petroleum engineers, production engineers, reservoir engineers and field supervisors 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$ 6,750 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:-

- 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 **2.4 CEUs** (Continuing Education Units) or **24 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. 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.

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:	***Monday, 16th of December 2024***
0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 - 0930	***Overview of Artificial Lift Technology***
0930 – 0945	*Break*
0945 – 1100	***Criteria for Selection of Artificial Lift System***
1100 – 1230	***Reservoir Performance: Inflow & Outflow Relationships***
1230 – 1245	*Break*
1245 – 1420	***Natural Flow***
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2:	***Tuesday, 17th of December 2024***
0730 – 0930	***Inflow Performance***
0930 – 0945	*Break*
0945 – 1100	***Tubing Flow Performance***
1100 – 1230	***Well Performance***
1230 – 1245	*Break*
1245 – 1420	***Artificial Lift Screening***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

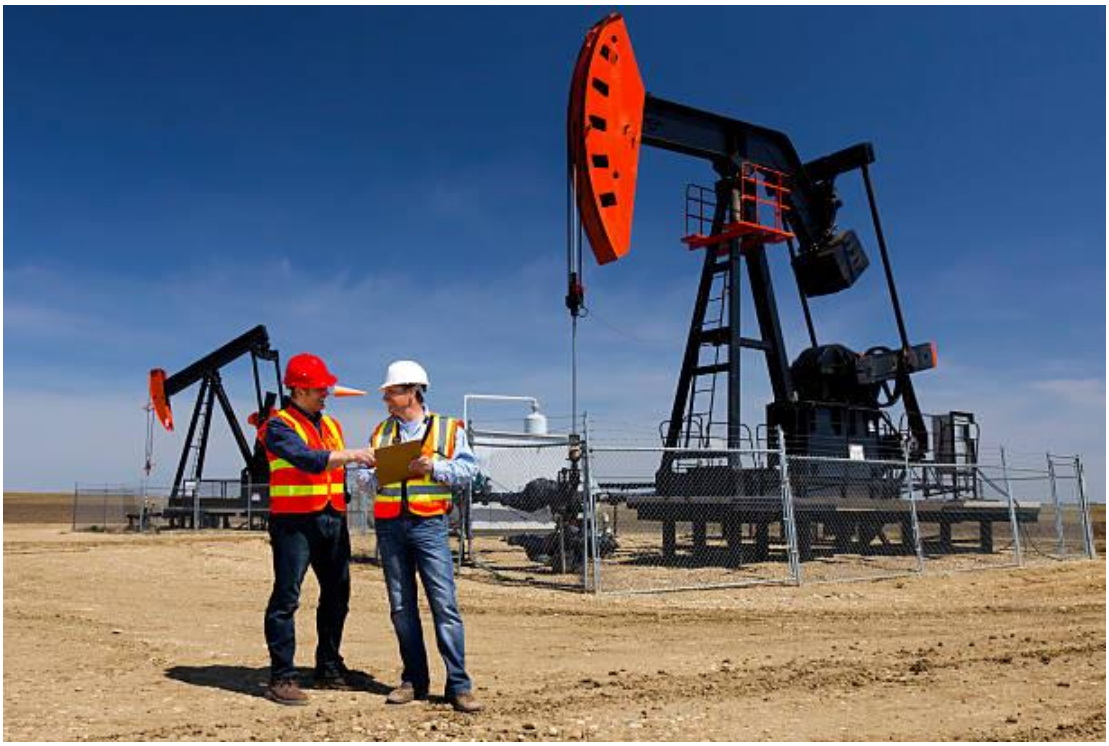
Day 3:	***Wednesday, 18th of December 2024***
0730 – 0930	***Introduction to Rod-Pumping, Gas Lift, & ESP Systems***
0930 – 0945	*Break*
0945 – 1100	***Rod-Pump Design: Pumping Unit, Rods, Pump, Prime Movers, Gas Anchor, Pump-off Controls***
1100 – 1230	***Application of Gas Lift Technology & its Limitations***
1230 – 1245	*Break*
1245 – 1420	***Gas Lift Design: Mandrels, Valves, Injection Gas Requirements, Temperature, Chokes, Spacing, Equilibrium Curve, Continuous Flow Design***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4:	***Thursday, 19th of December 2024***
0730 – 0930	***ESP Design: Pump Performance Curves, Pump Intake Curves, Typical Problems, Installation, Troubleshooting***
0930 – 0945	*Break*
0945 – 1100	***Best Practices for Installation & Maintenance***

1100 – 1230	***Economic Analysis***
1230 – 1245	*Break*
1245 – 1345	***Economic Analysis (cont'd)***
1345 – 1400	***Course Conclusion***
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

Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org