COURSE OVERVIEW DE0920
Artificial Lift ESP Downhole Equipment

Course Title
Artificial Lift ESP Downhole Equipment

Course Date/Venue
February 18-22, 2024/Hourous Meeting Room, Holiday Inn Suites Maadi,Cairo, Egypt

3.0 CEUs (30 PDHs) AWARD

Course Reference
DE0920

Course Duration/Credits
Five days/2.0 CEUs/20PDHs

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 advanced knowledge on electrical submersible pump (ESP). It covers the ESP components and accessories; the basic sizing principles; solving the basic pump; motor and cable problems; the concepts of PI and IPR; the importance of correctly matching well productivity to pump performance; the pumping high GOR wells; and the effects of gas on the performance of ESP's.

The course will also discuss the effects of viscosity on the performance of submersible pumps; the application to predict pump and motor performance under pumping viscous fluid; the effects of speed changes on the ESP; the proper techniques for designing variable speed pumping systems; and solving a problem using a variable speed controller.

Participants will be able to carryout well reservoir and performance review; employ advanced diagnostic techniques and methods; apply gas handling theory and practice; and perform practical exercises on the prediction of ESP performance under varying well and reservoir conditions as well analysis and diagnosis of real field examples from participants.

Course Objectives

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

- Apply and gain an advanced knowledge on electric submersible pumping
- Discuss the ESP components and accessories and basic sizing principles as well as solve basic pump, motor and cable problems
- Discuss the concepts of PI and IPR and determine the importance of correctly matching well productivity to pump performance
- Explain pumping high GOR wells and the effects of gas on the performance of ESP's
- List the effects of viscosity on the performance of submersible pumps and perform application to predict pump and motor performance under pumping viscous fluid
- Identify the troubleshooting methods required for failure analysis of electrical submersible pumps
- Discuss the effects of speed changes on the ESP and apply proper techniques for designing variable speed pumping systems and solve a problem using a variable speed controller
- Carryout well reservoir and performance review and ESP systems overview and operation as well as ESP diagnosis and interpretation
- Employ advanced diagnostic techniques and methods
- Apply gas handling theory and practice
- Perform practical exercises on the prediction of ESP performance under varying well and reservoir conditions as well analysis and diagnosis of real field examples from participants

Who Should Attend

This course provides an overview of all significant aspects and considerations of electrical submersible pump for engineers and technologists with direct responsibility for electric submersible pumping (ESP) and artificial lift systems design and troubleshooting including maximizing production and minimizing operating costs.

Course Fee

US$ 8,000 per Delegate + **VAT**. This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), 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. Hassan Ali is a **Senior Petroleum & Process Engineer** with over **30 years** of extensive experience in **Offshore** & **Onshore** fields within the **Oil & Gas** industries. He has great involvement and expert in all facets of **Production Operations** including Oil Plant & Process Operations for **Gas Compressors** Stations & **Condensate Recovery**, **Gas Dehydration/Regeneration** Units Troubleshooting, **Oil Production & Shipments**, Operations of Sea Water Intake **Pumping Station**, **Oil Storage Tanks** & Loading Facilities. His area of expertise includes **Electrical Submersible Pump** (**ESP**), **Crude Oil Artificial Lift** Systems, **Production Chemistry & Chemical Treatment** in the Oil & Gas Fields, **Processing & Well Testing** activities such as **Gas Lift Wells & ESP Well**, Natural Flow Wells, G/I Wells, G/L Wells, **GOSP & LGP** & Land Wells. He is further well-versed in **HYSYS & PIPESIM** Software Programs for Flow through **Pipeline** & **Process Equipment** such as Design of **Heat Exchangers** & Troubleshooting, Design of **Fired Heaters** & Operation Problems and **Air Coolers** & **Pumps** during his day-to-day work. Further, his wide experience also covers **Treatment** of **Crude Oil**, **Waste Water Treatment Technology**, **Production Shutdown**, **Gas Conditioning & Compressors**, **Plant Shutdown & Partial Shutdown**, **Surface Production Facilities**, Equipment Related & **Petroleum Risk Analysis**.

Mr. Ali is currently the **Field Production General Manager** of **SUCO** that is actively involved in the Production Operations, where he leads all On-shore Facilities, Plant & Off-shore Wells on Three Platforms and reviewed all Equipment Parameters such as Tanks, Vessels, Heat Exchangers, **Pumps Gas Flaring System** as well as **Quality Controller** of Crude Oil Analysis Salt Content & Shipment Crude Specifications to Tankers, Arrange Down Hole Surveys, Productions Logging Tools, Water Shut Off, Perforations, Chemical & Mechanical Tubing Cleaning, Operations of **Off-Shore Gas & Oil Separation** Plant, **Desalter** Plant, **Water Injection** Plant, Four **Gas Compressor** Stations & Four **Glycol** units, **Desalination** units & **R.O** units. Prior to this, he held challenging key positions as a **Production Engineer**, **Onshore Process Shift Engineer**, **Field Offshore Production Engineer**, **Offshore Supervisor**, **Process & Facilities Engineer**, **Production Supervisor**, **Processing Supervisor** and a **Senior Production Operations Engineer**. His experience was not only confined to the industry alone. He has been the **Senior Plant Engineer** in **KJO** and he was also able to contribute his expertise and impart his knowledge as a **Technical Instructor**.

Mr. Ali has a **Bachelor's** degree in **Petroleum Engineering**. Further, he is an **OSHA Certified**, a **Certified Instructor/Trainer** and holds **Certificates** in **School of Completion & Work Over** and **Well Testing** from the **USA** and has conducted numerous short courses, seminars, conferences and workshops internationally.

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 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, 18th of February 2024***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***ESP Components*** *Introduction to Equipment & Accessories that Make Up the Electric Submersible Pumping System • Introduction Basic Sizing Principles • Solve Basic Pump, Motor & Cable Problems*
0930 – 0945	*Break*
0945 – 1015	***Pump Sizing*** *Correctly Size an Electric Submersible Pump (ESP) • Solve Example Problems & Use the Example to Size an ESP*
1015 – 1215	***Well Productivity*** *The Concepts of PI & IPR • The Importance of Correctly Matching Well Productivity to Pump Performance • Use Computer Software to Plot Well & Pump Performance on the Same Graph*
1215 – 1230	*Break*
1230 – 1245	***Well Productivity (cont'd)*** *The Use of Data to Diagnose Well/Equipment Problems • Sample Problems to Strengthen these Concepts*
1245 – 1420	***Pumping High GOR Wells*** *The Effects of Gas on the Performance of ESP'S • Calculations to Determine the Amount of Free Gas Present at the Pump Intake • Calculating the Probability of Gas Interference & Appropriate Measures to Prevent Gas Locking • Problems Sizing Equipment for Gassy Wells*
1420 - 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today & Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day One*

Day 2: **Monday, 19th of February 2024**

0730 – 0800	***Pumping Viscous Fluid*** *The Effects of Viscosity on the Performance of Submersible Pumps*
0800 – 0930	***Pumping Viscous Fluid (cont'd)*** *Solve Example Problems & Work a Viscous Application to Predict Pump & Motor Performance*
0930 – 0945	*Break*
0945 – 1015	***Variable Speed Controllers*** *The Effects of Speed Changes on the ESP*
1015 – 1215	***Variable Speed Controllers (cont'd)*** *The Techniques for Designing Variable Speed Pumping Systems*
1215 – 1230	*Break*
1230 – 1420	***Variable Speed Controllers (cont'd)*** *Solve Example Problems & Solve a Problem Using a Variable Speed Controller* • *Use Computer Software to Plot Variable Speed Curves into PI/IPR Curves*
1420 - 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today & Advise Them of the Topics to be Discussed Tomorrow*
1430	*End of Day Two*

Day 3: **Tuesday, 20th of February 2024**

0730 – 0800	***Well Reservoir & Performance Review*** *Pressure Loss in The Wellbore* • *Calculation of Density & Other Fluid Properties* • *Inflow & Outflow*
0800 – 0930	***Well Reservoir & Performance Review (cont'd)*** *Impact of Changing Well Conditions & Need for Artificial Lift* • *Introduction to Pressure Gradient Plots & Use for Artificial Lift Design & Diagnosis*
0930 – 0945	*Break*
0945 – 1015	***ESP Systems Overview & Operation*** *Review of Principles of ESP Operation, Head Generation, Impeller Types & Characteristics* • *Impact on Well & Reservoir of ESP Operation*
1015 – 1215	***ESP Systems Overview & Operation (cont'd)*** *Use of Nodal™ Analysis in ESP Applications*
1215 – 1230	*Break*
1230 – 1420	***ESP Systems Overview & Operation (cont'd)*** *ESP Design Procedure & Sensitivity Analysis* • *Mechanical & Electrical Considerations*
1420 - 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today & Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Three*

Day 4: Wednesday, 21st of February 2024

0730 – 0800	***ESP Diagnosis, Interpretation & Troubleshooting*** *Monitoring Past & Present; Review of Electrical (amp Chart) Interpretation Techniques ● Hydraulic (Pressure) Diagnostic Principles & Use for Validation & Pump Performance Analysis*
0800 – 0930	***ESP Diagnosis, Interpretation & Troubleshooting (cont'd)*** *Data Analysis & Interpretation Examples ● Control & Optimization Applications*
0930 – 0945	*Break*
0945 – 1015	***Advanced Diagnostic Techniques & Methods*** *Effect of Sand (Wear) ● Blocking at Intake*
1015 – 1215	***Advanced Diagnostic Techniques & Methods (cont'd)*** *Handling Emulsions ● High Viscosity Fluids*
1215 – 1230	*Break*
1230 – 1420	***Advanced Diagnostic Techniques & Methods (cont'd)*** *Theory & Analysis of these Cases, Including Practical Team Exercises & Evaluation ● Detailed Review of Practical Case Histories of Complex Well & ESP Interactions*
1420 - 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today & Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Four*

Day 5: Thursday, 22nd of February 2024

0730 – 0800	***Gas Handling Theory & Practice*** *Review of Gassy Oils Properties (Effect of Bubble Point, GOR, Pressure, Composition Etc.)*
0800 – 0930	***Gas Handling Theory & Practice (cont'd)*** *Discussion of Gas Effects in Pump (Changing Volume, Effect on Pump Performance) & Wellbore*
0930 – 0945	*Break*
0945 – 1015	***Gas Handling Theory & Practice (cont'd)*** *Overview of Gas Handling Methods (Separation, Processing) & Review of New Technologies*
1015 – 1215	***Practical Workshop Session*** *Class Exercises on the Prediction of ESP Performance Under Varying Well & Reservoir Conditions*
1215 – 1230	*Break*
1230 – 1345	***Practical Workshop Session (cont'd)*** *Analysis & Diagnosis of Real Field Examples from Participants*
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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