COURSE OVERVIEW DE0323
Petroleum Production Performance
(E-Learning Module)

Course Title
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Course Reference
DE0323

Course Format & Compatibility
SCORM 1.2. Compatible with IE11, MS-Edge, Google Chrome, Windows, Linux, Unix, Android, IOS, iPadOS, macOS, iPhone, iPad & HarmonyOS (Huawei)

Course Duration
30 online contact hours
(3.0 CEUs/30 PDHs)

Course Description

This E-Learning course is designed to provide participants with a detailed and up-to-date overview of petroleum production performance. It covers the well productivity, inflow and vertical lift performance and tubing pressure traverse; the choke performance, well deliverability and tubing intake curve for ALS; the acid fracturing and hydraulic stimulation fracturing; the factors affecting fracture growth; the principles of formation fracturing including fracturing facilities around wellhead and the process of hydraulic fracturing; the perforations position, pressure drop across perforations, additives commonly used in the fracturing solution and proppant form; and the selected triplex pump, the effect of fracture job on well productivity and recovery of fracture cost.

During this course, participants will learn the completion design procedure, formation classification and perforating under-balance to overcome total skin damage; the nodal analysis and the general types of artificial lift; the tensile failure, corrosion failure and fatigue failure and its corrective actions; the electric submersible pumping system, progressive cavity pump, gas lift and plunger lift; the benefits, limitations, principles, classifications and components of ESPs; and the surface components, progressive cavity pump, polish rod and clamp arrangement and downhole gauge tool.

Course Objectives

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

- Apply and gain an in-depth knowledge on petroleum production performance
- Discuss well productivity, inflow performance relationship, vertical lift performance and tubing pressure traverse
- Calculate vertical lift performance and discuss choke performance, well deliverability and tubing intake curve for ALS
- Illustrate acid fracturing and hydraulic stimulation fracturing as well as identify the factors affecting fracture growth
- Explain the principles of formation fracturing including fracturing facilities around wellhead and the process of hydraulic fracturing
- Recognize perforations position, pressure drop across perforations, additives commonly used in the fracturing solution and proppant form
- Determine the selected triplex pump, the effect of fracture job on well productivity and recovery of fracture cost
- Employ completion design procedure, classify formation and determining perforating under-balance to overcome total skin damage
- Apply nodal analysis and outflow vertical lift performance as well as identify the general types of artificial lift including beam pumping, sucker rod pumping system, pump jack and failure analysis for sucker rod pumping system
- Describe tensile failure, corrosion failure and fatigue failure and apply corrective actions
- Avoid poor handing along the operations due to equipment and manpower shortage
- Recognize electric submersible pumping system, progressive cavity pump, gas lift and plunger lift
- Identify the benefits, limitations, principles, classifications and components of ESPs as well as coil tubing deployed ESP system
- Recognize surface components, progressive cavity pump, polish rod and clamp arrangement and downhole gauge tool

Who Should Attend

This course covers systematic techniques on petroleum production performance for all engineering and operations staff. Further, the course is suitable for maintenance, facility integrity, pipelines/piping, quality, Health, Safety and Environmental personnel who are seeking to improve their knowledge and skills on refinery processes and gain exposure on refinery concepts and technology including the operation, safety and control aspects.

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: -

- USA International Association for Continuing Education and Training (IACET)

  Haward Technology is an Authorized Training Provider by the International Association 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 1-2013 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 1-2013 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 Association 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 Fee

As per proposal

Training Methodology

This Trainee-centered course includes the following training methodologies:-

- Talking presentation Slides (ppt with audio)
- Simulation & Animation
- Exercises
- Videos
- Case Studies
- Gamification (learning through games)
- Quizzes, Pre-test & Post-test

Every section/module of the course ends up with a Quiz which must be passed by the trainee in order to move to the next section/module. A Post-test at the end of the course must be passed in order to get the online accredited certificate.

Course Contents

- Introduction Well Productivity
- Inflow Performance Relationship (IPR)
- Vertical Lift Performance (VLP)
- Tubing Pressure Traverse
- Calculation of the Vertical Lift Performance
- Choke Performance
- Quiz – 1
- Exercise – 1
- Well Deliverability
- Quiz – 2
- Tubing Intake Curve for ALS
- Class Example- High GOR Well
- Quiz – 3
- Exercise – 2
- Quiz – 4
- Quiz – 5
- Exercise – 3
- Exercise – 4
- Acid Fracturing

- Motive For Fracturing
- What is acid fracturing
- Acid Fracturing
- Etched fracture length
- Acid fracture simulation
- The Challenge
- Acids used in fracturing
- Additives used
- Application
- Hydraulic Stimulation Fracturing
- What is Hydraulic Fracturing?
- Reservoir Rocks
- Permeability and Rocks
- Fracture View
- Factors Affecting Fracture Growth
- Principles of Formation Fracturing
- Fracturing Facilities Around Wellhead
- Process of Hydraulic Fracturing
- What limits a fracture's growth?
- Perforations Position
- Pressure Drop Across Perforations
- Additives commonly used in the fracturing Solution
- Proppant Form
- Selected Triplex Pump
- Effect of Fracture Job on Well Productivity
- Recovery of Fracture Cost
- Completion Design Procedure
- Classify Formation
- Determining Perforating Under-Balance to Overcome Total Skin Damage
- Underbalance Used on TCP in Oil Zones in Sandstone
- System Graph – Nodal Analysis
- Nodal Analysis

- Outflow Vertical Lift Performance
- Outflow theoretical
- Outflow Actual
- VLP
- Vertical Lift Performance – Specific Gravity – API
- Composite Specific Gravity
- Pressure Gradient
- Exercise 1A
- Exercise 1B
- VLP
- VLP - Friction Loss
- Out Flow Performance
- System Graph
- Example
- Result
- General Types of Artificial Lift Means
- Basics of Artificial Lift
- Introduction to Artificial Lift
- Beam Pumping
- Sucker Rod Pumping System
- Pump Jack
- Quiz – 6
- Quiz – 7
- Beam Pumping – Sucker Rod Pumping
- Considerations for Use of Sucker Rod Pumping
- Beam Pumping
- Failure Analysis for Sucker Rod Pumping System
- Tensile Failure
- Corrosion Failure
- Fatigue Failure
- Corrective Actions
- Poor Handing along the Operations due to Equipment and Manpower Shortage

- Electric Submersible Pumping System (ESP)
- ESP
- Progressive Cavity Pump (PCP)
- PCP and the Electrical Submersible Progressive Cavity Pump
- Gas Lift
- Continuous-Flow Gas Lift
- Gas Lift - Advantages
- Gas Lift - Disadvantages
- Plunger Lift
- Details of Some Artificial Lift Means
- Electrical Submersible Pump (ESP)
- Introduction to ESP
- Benefits of ESPs
- Limitations of ESPs
- Principles of an ESP
- Quiz – 8
- Quiz – 9
- Introduction to ESP
- History of ESPs
- ESP Classifications
- Coil Tubing Deployed ESP System
- Coil Tubing Deployed ESP System - Offshore
- Cable Suspended ESP System
- Combination between ESP and Gas Lift
- ESP Shroud
- Quiz – 10
- ESP Components
- Quiz – 11
- Quiz – 12
- Quiz – 13
- Quiz – 14
- Quiz – 15

- Surface Components – Transformer
- Quiz – 16
- Surface Components - Switchboard
- Surface Components – Junction Box
- Surface Components – Wellhead
- Subsurface Components – Check Valve
- Quiz – 17
- Quiz – 18
- Subsurface Components – Electric Cable
- Subsurface Components – Cable Protection
- Subsurface Components –ESP Bypass System
- Subsurface Components – Electric Cable
- Subsurface Components – Cable Amperage
- Subsurface Components – Voltage Drop
- ESP Operating Principles
- Quiz – 19
- Centrality
- Quiz – 20
- ESP Classification
- Subsurface Components – Gas Separator
- Subsurface Components – Protector or Seal
- Gas Lift Arrangement
- Quiz – 21
- PCP (Progressive Cavity Pump)
- PCP System Configuration
- General features
- Polish Rod and Clamp Arrangement
- PCP Drive head Assembly
- Christmas tree
- VPD & GRC Panel
- Downhole Gauge Tool
- PCP Roto & Stator

- No turn tool (NTT)
- Tag Bar
- Advantages & Applications of a PC Pumping systems
- PCP Safety System
- Operating Parameters
- Quiz – 22