

Course No. 1855

Artificial Lift Design Process and Optimization Training Course

**UPSTREAM OPERATIONS, EXPLORATION, DRILLING, RESERVOIR &
PRODUCTION
OIL & GAS**

DURATION

5 Days

DELIVERY

Classroom



Course Overview

This advanced training course provides a comprehensive and practical approach to artificial lift design, selection, performance evaluation, and optimization for oil and gas wells. It focuses on improving well productivity, maximizing production rates, managing changing reservoir and well conditions, and achieving efficient and reliable artificial lift performance throughout the well lifecycle.

The course examines the major artificial lift methods used in oil and gas production, including sucker rod pumping, electric submersible pumping, gas lift, progressive cavity pumping, and hydraulic pumping systems. Participants will learn how to evaluate well and reservoir conditions, production requirements, fluid characteristics, pressure conditions, and operational constraints when selecting and designing an appropriate artificial lift system.

A strong emphasis is placed on the artificial lift design process, including data gathering, well performance analysis, inflow and outflow relationships, operating envelope definition, equipment sizing, system configuration, operating point selection, and performance forecasting. Participants will also examine how changes in reservoir pressure, water cut, gas-oil ratio, fluid properties, and well conditions affect artificial lift performance.

The program integrates design with optimization, surveillance, troubleshooting, failure prevention, and lifecycle management. Through practical calculations, case studies, and design workshops, participants will develop the ability to identify performance limitations, optimize operating parameters, reduce production losses, improve equipment reliability, and select appropriate interventions for artificial lift systems.

Objectives

- By the end of the course, participants will be able to:
- Analyze the principles and applications of artificial lift systems in oil and gas production.
- Evaluate well, reservoir, fluid, and production data required for artificial lift design.
- Compare artificial lift methods and select the most appropriate system for specific well conditions.
- Apply inflow and outflow performance concepts to artificial lift system design.
- Develop artificial lift design parameters based on production targets and well constraints.

- Evaluate equipment sizing, operating ranges, and system configuration.
- Analyze the impact of pressure, fluid properties, water cut, gas production, and well conditions on lift performance.
- Optimize artificial lift operating parameters to improve production and efficiency.
- Diagnose common artificial lift performance problems and identify their causes.
- Develop strategies for reducing failures, downtime, energy consumption, and operating costs.
- Apply production surveillance and performance data to identify optimization opportunities.
- Develop intervention and optimization plans for changing well and reservoir conditions.

Who Should Attend

This course is designed for petroleum engineers, production engineers, artificial lift engineers, well performance engineers, reservoir engineers, completion engineers, and field operations professionals involved in oil and gas well production and artificial lift systems.

It is particularly suitable for professionals responsible for artificial lift design, well optimization, production surveillance, pump performance, gas lift operations, production troubleshooting, well intervention, and production engineering studies.

The program is also relevant to production supervisors, asset engineers, operations managers, technical specialists, reliability and maintenance professionals, and decision-makers responsible for maximizing well productivity, improving artificial lift reliability, controlling operating costs, and optimizing field production.

Learning Outcomes

- Upon completion of the course, participants will be able to:
- Explain the principles, applications, advantages, and limitations of major artificial lift methods.
- Identify the data requirements for artificial lift system selection and design.
- Evaluate well inflow and outflow performance for artificial lift applications.
- Select suitable artificial lift methods based on reservoir, well, fluid, and production conditions.
- Develop preliminary and detailed artificial lift design parameters.
- Evaluate pump, tubing, gas injection, motor, and surface equipment requirements.

- Determine appropriate operating ranges and performance targets.
- Analyze artificial lift system performance using production and operating data.
- Identify underperforming artificial lift systems and diagnose common problems.
- Optimize operating parameters to improve production, efficiency, and equipment life.
- Evaluate the effects of changing water cut, gas-oil ratio, pressure, and fluid properties.
- Develop corrective actions and intervention strategies for artificial lift problems.
- Improve energy efficiency and reduce artificial lift operating costs.
- Establish surveillance and performance monitoring practices.
- Develop lifecycle optimization strategies for artificial lift systems.

Course Outline

DAY 01

Artificial Lift Fundamentals & Well Performance

- Principles and objectives of artificial lift in oil and gas production.
- Natural flow limitations and the need for artificial lift.
- Overview of major artificial lift systems and their applications.
- Well inflow performance and pressure relationships.
- Tubing performance and outflow behavior.
- Well and reservoir data requirements for lift design.

PRACTICAL APPLICATION

Evaluate a well's production conditions and determine the need and objectives for an artificial lift system.

DAY 02

Artificial Lift Selection & Design Process

- Artificial lift selection criteria and decision-making framework.
- Evaluating sucker rod pumping, electric submersible pumping, gas lift, progressive cavity pumping, and hydraulic pumping.

DAY 02 — CONTINUED

- Well depth, production rate, fluid properties, pressure, temperature, and completion considerations.
- Production targets and artificial lift operating envelopes.
- Equipment sizing and system configuration.
- Design constraints, surface requirements, and operating limitations.

PRACTICAL APPLICATION

Select the most suitable artificial lift method for different well scenarios and develop preliminary design parameters.

DAY 03

Artificial Lift System Design & Performance Analysis

- Detailed design considerations for major artificial lift systems.
- Pump sizing, operating point, efficiency, and performance characteristics.
- Gas lift injection principles and injection rate optimization.
- Electric submersible pump system configuration and operating considerations.
- Sucker rod and progressive cavity pump design considerations.
- System performance forecasting and operating envelope development.

PRACTICAL APPLICATION

Develop and evaluate an artificial lift design using representative well and production data.

DAY 04

Artificial Lift Optimization, Troubleshooting & Reliability

- Artificial lift surveillance and performance monitoring.
- Identifying production losses and underperforming lift systems.
- Common pump, gas lift, tubing, electrical, mechanical, and operational problems.
- Gas interference, pump-off conditions, excessive water production, solids, scaling, and fluid-related problems.
- Optimization of operating parameters and production settings.

DAY 04 — CONTINUED

- Failure prevention, reliability improvement, and intervention planning.

PRACTICAL APPLICATION

Diagnose an artificial lift performance problem and develop an optimization and corrective action plan.

DAY 05

Advanced Optimization & Lifecycle Management

- Artificial lift optimization under changing reservoir and well conditions.
- Managing increasing water cut, changing gas-oil ratio, declining pressure, and changing fluid properties.
- Energy efficiency and operating cost optimization.
- Artificial lift replacement, redesign, intervention, and workover decisions.
- Integrating artificial lift performance with field production optimization.
- Performance indicators, surveillance strategies, and continuous improvement.

FINAL WORKSHOP

Develop an integrated artificial lift design and optimization plan for a producing well, covering system selection, design parameters, operating strategy, surveillance, troubleshooting, intervention priorities, and lifecycle optimization.

Register or Request More Information

Course page: <https://quest-training.com/courses/artificial-lift-design-process-and-optimization-training-course>

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