



# Intelligent Well Completions. Oil and Gas Field Optimization

## Course Description

This course provides a comprehensive overview of advanced intelligent well completions for oil and gas wells. Intelligent well completion system, use an integrated systems approach to optimize oil and gas production in a well. The benefits and multiple applications of intelligent/smart wells will be widely discussed. Design methodologies of completing intelligent wells will also be emphasized with multiple hands-on field examples.

During the course, hands-on exercises on intelligent well modelling and value quantification via nodal analysis the be addressed.

The course will be supplemented by practical class examples, group exercises and interactive group discussion designed to consolidate and reinforce learning, identify and offering solutions to specific problems associated with intelligent well completions.

## Who Should Attend?

This course is designed for petroleum and production engineers, integrated study members, reservoir engineers, reservoir managers, production managers, and others engineers seeking knowledge intelligent well completions and oil and gas field optimization.

1. Preferably, attendants should have some basic knowledge of drilling and completion operation, production engineering and reservoir characterization.



## What You Will Gain:

1. Understanding the benefits and multiple applications of intelligent wells
2. Learning the methodologies of completing intelligent wells
3. Learning about Intelligent well control equipment, Inflow Control Devices (ICDs), Inflow control Valves (ICVs), and Active Inflow Control Devices (AICDs).
4. Understanding the ICD design fundamentals, Nozzle type ICD, Hybrid ICD design, Autonomous or active ICD.
5. Learning the ICV design, and ICV operating methods: Hydraulic systems, Electrical systems, Electro-hydraulic systems.
6. Understanding main parameters for intelligent well selection
7. Learning the best practices and lessons learned and from case studies
8. Understanding the digital oilfield and real-time production optimization process

## Training Methodology

The training course will combine lectures (30%) with workshop/work presentations (30%), interactive practical exercises and case studies (20%), supported by video material, software and general discussions (20%)

## Course Content

### Overview of Intelligent Well Completion Systems

- What are intelligent/smart wells?
- What is intelligent well completions system
- Role of intelligent wells in the context of the Digital Oil field –DOF
- Applications of Smart wells
- Intelligent well control equipment

### Overview of Intelligent Well Completion Systems

- ICD Design
  - Channel type ICD
  - Orifice or Nozzle type ICD
  - Hybrid ICD design
  - Autonomous or active ICD
- ICV Design
  - Open/close ICV
  - Choking ICV
- ICV operating methods
- Intelligent well selection
- How to make the choice between passive and active inflow control completions



- Benefits of intelligent well completions system – field examples and case studies

### **Intelligent Well Systems (IWS) Modeling and Value Quantification**

- Nodal Analysis for IWS
- Intelligent Well Value Quantification

### **Dynamic Optimization of Intelligent Well Systems (IWS)**

- Real time optimization (RTO)
- Sensor Systems
- Model-Based Production Optimization of IWS
  - Optimization problem formulation
  - Optimization tools
  - Optimization of IWS
- Down hole water separation systems
  - Applications
  - Equipment configuration
  - Case studies

### **Intelligent Field Development Planning and Optimization**

- Designing intelligent oil and gas fields
- Basic economic considerations for intelligent oil and gas fields
- Risk analysis in intelligent field developments
- Intelligent field development planning
- Intelligent field development optimization
- Guidelines for intelligent oil and gas field development optimization
- Field Examples, discussion of lesson learned