

This course can be adapted to virtual classroom mode - Graduate Certificate

## Offshore Field Development Engineering Certification

65 days

OFFSHIG-EN-A

### Overview

#### LEVEL

Knowledge

#### PURPOSE

This program aims to provide engineers a comprehensive knowledge of offshore field development best practices in order for them to efficiently contribute to offshore field development studies and/or projects.

#### LEARNING OBJECTIVES

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

- adopt industry best practices for offshore drilling and well control,
- propose most adapted field architecture scenario,
- contribute to subsea production systems and pipelines design, taking into account flow assurance issues,
- assess hazards specific to offshore developments and participate in safety engineering and environmental impact assessment studies,
- efficiently contribute to offshore field development studies taking into account economics, project management and offshore installation aspects.

#### WAYS AND MEANS

Highly interactive course delivered by experts of the E&P industry.  
Numerous examples and feedbacks from the industry.  
Multiple teamwork sessions on industrial case studies.  
Final group project on a real offshore field development case study.

#### LEARNING ASSESSMENT

Continuous assessments all-along the program.  
Final assessment including a presentation in front of a jury.

#### PREREQUISITES

Engineering degree or equivalent experience in an Oil & Gas company.

#### WHY AN IFP TRAINING CERTIFICATION?

- An international recognition of your competencies.
- A Graduate Certificate delivered.
- An expertise confirmed in Offshore Field Development Engineering Certification.
- Ready-to-use skills.

### Agenda

#### FUNDAMENTALS OF GEOSCIENCES & RESERVOIR ENGINEERING

5 d

Petroleum geology and geophysics. Reservoir fluids. Petrophysics.  
Well log interpretation. Well testing. Reservoir engineering and simulation.

## OFFSHORE DRILLING

Offshore rig descriptions. Limits of use of the rigs.  
Specific equipment for various rigs (jack-up, semi-submersible, drillship):  
Mud line suspensions.  
Riser tensioner, passive and active heave compensator.  
BOP, BOP closing unit, risers, positioning.  
Typical drilling program for each type of rig (fixed and floating).

5 d

## WELL CONTROL

Various pressures in the well. Definitions of pressures. Kick detection. Principles of well control methods.  
Equipment and testing procedures. Subsea equipment. Simulator.

5 d

## SUBSEA WELL ARCHITECTURE, COMPLETION & ACTIVATION

Casing program design, implementation and procedures. Well productivity of horizontal and multilaterals wells. Well completion design, and well completion equipment. New completion trends: Intelligent completion.

5 d

## OFFSHORE FIELD ARCHITECTURE & PRODUCTION STRUCTURE

Constraints specific to offshore production. Offshore production structures: jacket, semi-submersible, SPAR, TLP, FPSO...: technology, selection criteria, limitations; focus on FPSO technology. Offshore field architecture (study of various options, feedback from industry, selection criteria): surface/subsea wells, natural gas field developments, crude oil field developments.

5 d

## SUBSEA PRODUCTION SYSTEM (SPS)

Subsea components and field architecture. Pipeline and risers. Subsea construction and intervention. Inspection, maintenance and repair. Operation from production platform.

5 d

## SUBSEA PIPELINES & FLOW ASSURANCE ISSUES

Pipelines technology: design of subsea pipelines and risers, flexible pipelines design; offshore pipeline construction, shore approach construction, subsea tie-in; pipeline operation and integrity. Study of flow assurance issues using PIPESIM™ software: fundamentals of fluid mechanics, multiphase flow; flow assurance issues (flow stability, erosion, deposits, hydrates, heat transfer issues); study of wet gas streams. Study of crude oil streams.

5 d

## OFFSHORE PROCESSING TECHNOLOGY

Main specifications and required treatments. Crude oil processing: Multi-Stage Separation (MSS), dehydration and desalting, sweetening, offshore storage; technologies specific to offshore facilities (case of FPSOs). Gas processing and compression: sweetening, dehydration, Natural Gas Liquids (NGLs) extraction; gas compression chain. Production and injection water processing: produced water treatment technologies for offshore facilities, seawater treatment for injection: chlorination, filtration, oxygen removal, sulfate removal.

5 d

## SAFETY ENGINEERING APPLIED TO OFFSHORE DEVELOPMENTS

Process Hazard analysis - HAZID studies, HAZOP studies. Plant layout in offshore facilities. Case study of shallow waters and FPSO .  
Major hazard assessment in offshore process facilities. Safety instrumented systems. Fire detection and protection systems. Emergency evacuation and rescue in offshore facilities.

5 d

## ENVIRONMENTAL IMPACT MANAGEMENT OF OFFSHORE DEVELOPMENT PROJECTS

Environmental impact of offshore production operations. Main regulations regarding offshore operations. OSPAR, IMO, other regional agreements. Environmental impact assessment in offshore projects. Best available technologies for impact mitigation. Oil spill contingency plan.

5 d

## PETROLEUM ECONOMICS - PROJECT MANAGEMENT & OFFSHORE INSTALLATION

Project profitability evaluation - Risk analysis of Exploration & Production projects. Project management: project cost estimation and cost control, contracts management, offshore installation: preparation, installation operations, construction vessels, works management.

5 d

## OFFSHORE FIELD DEVELOPMENT PROJECT - JURY

10 d

10-day teamwork offshore field development project based on actual data. Participants are coached throughout the project to produce the required deliverables, which are to be presented on the last day (jury):

Field architecture. Drilling campaign, well design and completion. (Subsea) Production system design and sizing. Assessment of flow assurance issues. Production structure and process scheme. HAZID, plant layout studies. Project profitability. Project Management. Contracting strategy. Installation Management.