

## Integrated Production Modeling - Module 1

5.00 days

SPRO/PRODOPT1GB

### Overview

#### AUDIENCE

Production engineers, petroleum engineers or reservoir engineers willing to integrate reservoir with surface models using Integrated Production System technology.

#### PURPOSE

This course provides a thorough understanding, methodology and tools to integrate data and models from the reservoir to the surface facilities.

#### LEARNING OBJECTIVES

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

- predict global production through integrated modeling,
- describe MBAL™, PROSPER™ and GAP™ theory, capabilities and synergies,
- perform a case study aiming at building tank model, PVT match, well performance and surface network including the use of specialized software (IPM™, MBAL™, PROSPER™, GAP™),
- apply integrated modeling using the mentioned tools.

#### PREREQUISITE

No prerequisites for this course.

#### WAYS AND MEANS

Interactive presentations, practical exercises and hands-on activities using dedicated software (IPM™, MBAL™, PROSPER™, GAP™).

## Agenda

### WELL PERFORMANCE

2.00 d

Introduction to well performance nodal analysis: inflow/outflow.  
Review on Productivity Index (PI).  
Inflow performance relationship in oil wells, Darcy's law, pseudo-steady state flow, Vogel IPR, composite IPR, Darcy IPR, Fetkovich IPR, Jones IPR.  
Transient IPR curves.  
Vertical Lift Performance (VLP) correlations and curves, downhole production considerations: skin calculation, gravel pack design.  
Multiphase flow in tubing, liquid holdup, flow regimes, correlations in nodal analysis.  
Overview of PROSPER™ software workflow.  
PROSPER™: building initial well system file - IPR modeling using PROSPER™, building a wellbore model, sensitivity studies.  
Partial penetration, deviated wells, hydraulically fractured wells, gravel pack completions, artificial lift.  
Skin estimation.

### RESERVOIR PERFORMANCE & MODELING: PREDICTION OF PRODUCTION PROFILE

2.00 d

Material balance for various reservoirs: production mechanisms.  
Flow regimes (transient and pseudo-steady state flow).

Reservoir modeling through material balance.  
Introduction to MBAL™.  
MBAL™ data input and modeling aspects. Aquifer dimensioning and modeling.  
History matching techniques on MBAL™: analytical and graphical methods.  
Forecasting production performance.  
Tank model building, PVT and correlations matching, history matching.

## INTEGRATED PRODUCTION SYSTEM MODELS

0.50 d

Definition.  
Introduction to the software tool to be used.  
From reservoir to surface: the principle of linking MBAL™, PROSPER™ and GAP™.

## GLOBAL PRODUCTION MODELING & OPTIMIZATION

0.50 d

Full field optimization and forecasting approach.  
GAP™ software overview and main functions.  
System definition, how to link MBAL™ and PROSPER™ models to GAP™ solve network.  
Full field development hands-on exercise: prediction constraints.