



Sample Training Agenda (5 days):
Introduction to Integrated Production Modelling
(using Prosper, GAP & MBAL)

Date:

Location:

Day 1 : Well systems overview

Introduction to integrated field modelling; interactions and dependencies

Fundamental concepts behind pressure loss in the wellbore

- gravity, friction and acceleration terms; slip and holdup, flow regimes, key parameters
- theory and use of multiphase flow correlations; selection recommendations and matching techniques
- practical applications in data measurement and validation

Fluid characterisation methods

- oil composition; calculation of density and other fluid properties
- black oil correlations and compositional equations of state
- matching and validation techniques for gas and oil

Practical workshop session; introduction to commercial software (*Prosper*)

- building a naturally flowing well model; defining wellbore, fluid and inflow characteristics
- PVT matching; review and selection of available flow correlations
- validation and diagnosis of well performance

Day 2 : Inflow performance and Introduction to Artificial Lift Methods

Inflow performance modelling

- introduction and key concepts
- Vogel, Darcy, multi-layer, horizontal, fractured models etc.
- theory of skin and applications (vertical, deviated, partial penetration, damage)

Introduction to artificial lift theory and concepts

- comparison and selection criteria; advantages and disadvantages of each method
- overview of major lift methods (gas-lift, ESP, PCP, HSP, jet pump, beam); benefits and selection principles
- use of pressure gradient plots for design and diagnosis of each method

Practical workshop session; inflow performance modelling and full system prediction (*Prosper*)

- building and matching inflow models; running sensitivities
- skin analysis and diagnosis; matching to production logs (PLT) and flowing gradient surveys
- combining with vertical lift performance curve to run system sensitivities (nodal analysis)

Days 3: Introduction to Reservoir Engineering

Introduction to reservoir engineering methods

- comparison of material balance and simulation techniques
- material balance fundamental concepts and equations
- aquifer models, history matching (graphical and numerical)
- predictions, use of well lift curves and inflow performance, adding constraints
- extension to connected tanks and compositional gradient applications

Practical workshop session; reservoir modelling (*MBAL*)

- building a tank model; data requirements and validation; history matching; running predictions
- linking to well models (importing inflow and lift curves); adding constraints & well scheduling
- use and application of multi-tank models; new field development exercise



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...continued

Day 4 : Surface network modelling

Introduction to surface network modelling

- horizontal flow concepts and flow correlations
- well performance curves, interactions between wells and pipelines
- full field optimisation methods (natural flow, gas-lift and ESP wells)

Practical workshop session; building a field network model (GAP)

- build simple field network model, linking to well models
- importing well performance curves, lift curves and inflow performance data
- matching flowline pressure loss; use for production allocation; adding constraints & other equipment
- snapshot field prediction and optimisation; gas-lift gas and ESP power allocation techniques

Day 5 : Full field production forecasting and optimisation

Practical workshop session; full field network modelling

- linking to reservoir models; setting time dependent constraints and controls
- running full field prediction and optimisation
- linking to water and gas injection models; applications with multi-layer models
- class EXERCISE; building a new field development model & generating production profiles

Review, conclusions and evaluation form completion

Note: Each day will include practical workshop sessions illustrating the application of theory to well, network and reservoir models. Participants are encouraged to bring data and examples to interpret and analyse.