# Upscaling: from Static to Dynamic Model

## 3 days Overview

**LEVEL**
Skilled

**PURPOSE**
This course provides participants with a clear understanding of the techniques related to upscaling.

**LEARNING OBJECTIVES**
Upon completion of the course, participants will be able to:
- recognize the techniques and challenges related to upscaling (properties, methods, validation),
- build required competencies to analyze reservoir heterogeneities in order to define the aggregation rate,
- apply the workflow for generating an upscaled grid using dedicated software Petrel™ and Eclipse™,
- validate the upscaled grid (static and dynamic models).

**WAYS AND MEANS**
Interactive presentations, hands-on real case study using software dedicated for reservoir modeling: Petrel™ and Eclipse™.
Software used during workshops: with courtesy of Schlumberger.

**PREREQUISITES**
Degree in geology or reservoir engineering, or equivalent experience, with basic knowledge in dynamic modeling.

## Agenda

**INTRODUCTION TO UPSCALING**
Objectives of upscaling.
Why upscaling?
Aggregation rate, up-layering, heterogeneities, geological features.
Properties to upscale: porosity, net-to-gross, rock-types, saturation, permeability.

0.25 d

**UPSCALING METHODS**
Algebraic methods: Cardwell and Parsons.
Numerical methods: flow based method.
Criteria to choose the upscaling method.

0.5 d

**VALIDATION**
Static validation: volumes, histograms.
Dynamic validation: volumes, simulation results on fine and coarse grids, well transmissivity.

0.25 d

**UPSCALING WORKSHOP: REAL CASE STUDY**
Geological model: heterogeneities.
Facies proportion curves analysis.
Up-layering definition: choice of the most appropriate up-layering.
Zone division and zone mapping.

2 d
Scale-up properties methodology: choice of the most appropriate method.
Volume calculation: static validation.
Dynamic validation: simulation and comparisons with the fine model.
Synthesis and wrap-up.