Reservoir Fluid Properties - PVT
Reservoir Fluids Properties - Oil & Gas

5 days
Overview

LEVEL
Skilled

PURPOSE
This course provides a comprehensive and practical understanding of Oil & Gas reservoir fluids properties and related behavior as well as corresponding data and laboratory PVT experiments.

LEARNING OBJECTIVES
Upon completion of the course, participants will be able to:
- discuss main principles of thermodynamics applied to reservoir engineering studies,
- describe reservoir fluids and discuss corresponding fundamental PVT properties,
- describe the PVT studies performed in order to get PVT data,
- describe and apply the process to build PVT models from experimental data, especially for reservoir simulation.

WAYS AND MEANS
Interactive lectures and exercises.
Analyzing a real PVT report.
Hands-on practices using state-of-the-art EOS package for PVT matching.

LEARNING ASSESSMENT
Knowledge assessment with multiple choice questions and open explanatory questions.

Agenda

FUNDAMENTALS OF THERMODYNAMICS
1.5 d
Petroleum fluids genesis.
Chemical composition of petroleum fluids:
Hydrocarbon families.
Compositional presentation of reservoir fluids.
Thermodynamics of petroleum fluids:
Pure component, binary mixture, multi-component systems. Phase behavior.
Hydrocarbon fluids: under saturated oil, saturated oil, dry gas, wet gas, retrograde gas. Phase envelope.
Measurements:
Sampling: bottom hole and surface sampling; representativity and validity of sampling; analysis; PVT studies (Oil & Gas condensate).

PROPERTIES OF HYDROCARBON FLUIDS
2.5 d
Thermodynamics: mixture equilibrium, fluids classification.
Liquid-vapor equilibrium:
Real equilibrium, thermodynamics potential, fugacity.
Saturation pressure, formation volume factor, density, compressibility, viscosity.
Equation of state:
Peng-Robinson, Soave-Redlich-Kwong.
Liquid-vapor calculation.
Analytical representation: properties of light and heavy cuts.
Fluid modeling: PVT matching.
Fluid synthesis: gravity segregation, field cases, miscibility.
Downstream data: data for reservoir simulator and process.

PVT MODELING
Matching a PVT model to experimental data using a PVT EOS package.