MERCURY

Petroleum Reservoir Fluid and Phase Behavior in the Oil & Gas

10 – 14 May 2027
Madrid (Spain)



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Ref: 6084_301367 **Date:** 10 – 14 May 2027 **Location:** Madrid (Spain) **Fees:** 6200 Euro

Introduction

This PVT and phase behavior in petroleum reservoirs course will endeavor to impart to participants thorough knowledge concerning the characteristics of hydrocarbon substances, accentuating their phase behaviors and the practical utility of such knowledge within production ecosystems. Those enrolled will gain insights into technical basics, correlation of properties, and the integration of phase behavior principles and thermodynamics to troubleshoot and resolve practical industry challenges.

Key focal points of this PVT and phase behavior in petroleum reservoirs course will provide details of petroleum components, construction of phase envelopes, exploration of the concept of excess fraction, and classification and identification of different fluid types. Additionally, participants will delve into computing the viscosities affiliated with each fluid type, understanding interfacial and surface tension dynamics, pertinent laboratory and field tests, and the simulation of the transport properties inherent to petroleum fluids.

Moreover, the expanded PVT and phase behavior in petroleum reservoirs course content will deeply probe into the domain of petroleum reservoir fluids and phase behavior, ensuring that the curriculum encompasses a multitude of critical aspects, such as petroleum oil and gas reservoir engineering, petroleum reservoir rock and fluid properties, and fluid gradient oil and gas, all while avoiding repetitive information.

This PVT and phase behavior in petroleum reservoirs course ensures that participants receive a well-rounded and in-depth educational experience in this critical facet of petroleum engineering.

Course Objectives

At the end of this PVT and phase behavior in petroleum reservoirs course, the participants will be able to:

- To understand the principles of PVT Pressure-Volume-Temperature and phase behavior of petroleum reservoir fluids.
- To identify and classify components of petroleum.
- To master the creation of phase envelopes.
- To accurately classify and discern different types of fluid.
- To ascertain the properties of crude oil and formation water.
- To obtain knowledge about natural gas essentials and classifications, the behavior of ideal and natural gasses, and the impact of water content on natural gas properties.
- Explore the transportation properties of petroleum, gas, water, and emulsions.
- To execute material balances, apply equilibrium ratios, and determine dew point, bubble point, and other equilibrium conditions.

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Targeted Groups

- Petroleum Engineers.
- Reservoir Engineers.
- Geoscientists.
- Oilfield Technicians.
- Energy Analysts.
- Industry Professionals.
- Postgraduate Students.

Targeted Competencies

By the end of this PVT and phase behavior in petroleum reservoirs course, the target competencies will be able to:

- Fluid property analysis.
- Phase behavior prediction.
- Application of Equations of State EOS.
- Reservoir performance evaluation.
- Fluid management strategies.

Course Outline Content

Unit 1: Introduction to Reservoir Fluids

- Comprehension of reservoir fluids nuances.
- Understand the categorization of reservoir fluids: gas, oil, condensate, and heavy oil.
- Learn about the pivotal role of phase behavior analyses within reservoir engineering.
- Understand techniques for fluid sampling and subsequent analyses.

Unit 2: Properties of Reservoir Fluids

- Learn about the fundamental attributes of reservoir fluids: density, viscosity, and API gravity.
- Emphasize the significance of PVT analysis.
- Understand the interplay between fluid composition and reservoir behavior.
- What is the interrelation of reservoir fluids and rock attributes?

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Unit 3: Phase Behavior Analysis

- Delve into phase equilibrium regarding reservoir fluids.
- Learn about the elucidation of phase diagrams and locating critical junctures.
- Influence of pressure and temperature variations on phase behavior.
- Utilize phase behavior data to enhance reservoir modeling.

Unit 4: Equations of State EOS

- Overview of groundwork introduction to EOS and its practical applications.
- Prominent EOS models: Peng-Robinson and Soave-Redlich-Kwong.
- Computation of phase equilibrium using EOS.
- Implement EOS within reservoir simulation projects.

Unit 5: Gas Condensate Reservoirs

- Understand the substantive study on the behavioral patterns of gas condensates within reservoirs.
- Recognize and tackle performance issues like condensate dropout and retrograde condensation.
- Understand strategies for heightened recovery from gas condensate reservoirs.
- Learn about optimal approaches for fluid sampling, specifically in gas condensate contexts.

Unit 6: Crude Oil Reservoirs

- Dissecting the behavior of various states of crude oil reservoirs: undersaturated, saturated, and oversaturated.
- Understand the analysis of crude oil's viscosity, density, and imperative properties.
- Learn about insights on enhanced oil recovery techniques for heavier crude varieties.
- Discuss fluid sampling techniques in crude oil reservoirs.

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Unit 7: Heavy Oil and Bitumen Reservoirs

- Learn about the distinctive characterization of heavy oils and bitumens.
- Understand the examination of thermal and chemical extraction methods.
- Addressing production hurdles for heavy oils: reducing viscosity and managing sand output.
- Learn to use sampling techniques and analyze heavy oil and bitumen reservoir fluids.

Unit 8: Reservoir Fluid Sampling and Analysis

- Demonstrate the importance of precise fluid sampling within reservoir management.
- Learn about a survey of fluid analysis methods: PVT lab tests, downhole sampling, and compositional studies.
- Understand the interpretation of PVT data to predict phase behavior.
- Case studies illustrating fluid sampling and analyses across diverse reservoir types.

Unit 9: Fluid Behavior in Reservoir Management

- Quantify the effects of fluid behavior on designing wells and production plans.
- Incorporate phase behavior data within the realm of reservoir simulation and modeling.
- Decision-making processes for economic production based on detailed fluid analyses.
- Learn the advanced strategies for optimizing reservoir recovery derived from fluid management insights.

Unit 10: Case Studies and Practical Applications

- Overview of compendium of real-world examples highlighting phase behavior challenges in assorted reservoir settings.
- Understand techniques to parse and leverage reservoir fluid data to elevate production indices.
- Create robust fluid management frameworks responsive to phase behavior data.
- Understand strategic responses to unforeseen phase behavior complications during reservoir operations.