

Reservoir Fluid Characterization and EOS Modeling Training Course

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Overview

Reservoir Fluid Characterization and EOS Modelling Training Course is a one-week intermediate course for reservoir, PVT, petroleum, production, process, simulation, and subsurface engineers who leave with a Reservoir Fluid Model File. Participants connect representative sampling and PVT data quality to hydrocarbon phase behavior, heavy-end characterization, cubic equation of state tuning, and fluid model validation. The course prepares a quality-controlled model for reservoir, production, and process studies. Agile Leaders Training Center presents reservoir fluid characterization and EOS modelling.

Who Should Attend

- Reservoir-engineering functions responsible for fluid descriptions and simulation inputs
- PVT and laboratory functions responsible for representative samples, experiments, and data quality
- Petroleum and production functions responsible for fluid-property effects on wells and facilities
- Simulation functions responsible for compositional models and phase-behavior inputs
- Process-engineering functions responsible for fluid properties and separation studies
- Technical-assurance functions responsible for model review, validation, and uncertainty

The course assumes participants already use reservoir-fluid, laboratory, compositional, or engineering data at work, and it leaves out full dynamic reservoir simulation, history matching, drilling-fluid design, and generic thermodynamics.

Departments and Industries

The course supports departments and industries that build, use, or assure hydrocarbon-fluid models.

- Reservoir engineering, PVT analysis, and subsurface modeling
- Petroleum engineering, production technology, and field development
- Fluid laboratories, sampling services, and technical assurance
- Oil, gas, condensate, and underground-storage operations
- Process engineering, surface facilities, and flow assurance
- Energy consulting, engineering services, and applied research

Learning Objectives

By the end of this course, participants will be able to:

- Evaluate representative samples and PVT data quality
- Analyze fluid classes, phase envelopes, and laboratory experiments
- Build a compositional description with heavy-end characterization
- Apply cubic equations of state and phase-equilibrium calculations
- Use regression to tune and validate EOS parameters
- Prioritize uncertainty, documentation, and model-use controls

Course Agenda

Day 1: Qualify Fluid Evidence

- Reservoir-Representative Sampling and Contamination Checklist
- PVT Report Quality-Control and Consistency Register
- Fluid Classification and Phase-Envelope Interpretation Method
- Bubble-Point, Dew-Point, and Critical-Property Review
- Composition, Units, Conditions, and Data-Lineage Sheet

Day 2: Characterize Components

- Compositional Analysis and Component-Slate Design
- C7+ Plus-Fraction Property Characterization Method
- Heavy-End Splitting and Pseudo-Component Scheme
- Component Lumping and Model-Complexity Decision Matrix
- Critical Property, Acentric Factor, and Molecular-Weight Table

Day 3: Construct the EOS Model

- Peng-Robinson and Soave-Redlich-Kwong Selection Matrix
- Fugacity, Flash, and Phase-Equilibrium Calculation Workflow
- Volume Translation and Density-Correction Method
- Binary Interaction Parameter Initialization Register
- Base EOS Model and Phase-Envelope Diagnostic

Day 4: Tune and Validate

- Constant-Composition Expansion Matching Dashboard
- Differential-Liberation and Separator-Test Regression Plan
- Constant-Volume Depletion and Gas-Condensate Validation
- Parameter Sensitivity, Weighting, and Physical-Constraint Review
- Volatile-Oil, Heavy-Oil, and Uncertainty Assessment

Day 5: Practice Fluid Modelling

- Suggested Exercise: Screen a PVT Laboratory Data Pack
- Suggested Exercise: Characterize and Lump a Plus Fraction
- Suggested Exercise: Tune a Cubic EOS to Experiments
- Suggested Exercise: Validate Phase Behavior and Fluid Properties
- Capstone Exercise: Complete the Reservoir Fluid Model File

Practical Exercises

The course uses suggested activities to convert laboratory evidence into a controlled and reviewable fluid model.

- Suggested activity: assess sample representativeness, contamination indicators, units, conditions, and internal consistency in a PVT report.
- Suggested activity: split, characterize, and lump a heavy fraction while preserving the engineering purpose of the model.
- Suggested activity: regress selected EOS parameters against expansion, liberation, depletion, and separator evidence.
- Suggested activity: document validation plots, sensitivities, limitations, uncertainty, and approved model uses.

FAQs

Who suits reservoir fluid characterization and EOS modelling training, and what does it assume?

Reservoir fluid characterization and EOS modelling training suits reservoir, PVT, petroleum, production, process, simulation, subsurface, and assurance functions. It assumes practical familiarity with hydrocarbon-fluid data, laboratory reports, engineering calculations, or model inputs.

What data supports reservoir fluid characterization and EOS modelling?

Reservoir fluid characterization uses representative samples, composition, pressure-volume-temperature experiments, fluid-property measurements, test conditions, quality checks, and engineering context. The evidence must be traceable and internally consistent before tuning begins.

How does EOS modelling differ from dynamic reservoir simulation training?

EOS modelling constructs and validates the fluid-property description used by engineering models. Dynamic reservoir simulation training focuses on grids, rock-flow functions, wells, controls, numerical runs, history response, and forecasts using fluid inputs.

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Why is C7+ characterization important in a reservoir fluid model?

C7+ characterization represents the heavy fraction through estimated properties, splitting, pseudo-components, and lumping. These choices affect phase behavior, density, liquid dropout, and the balance between model fidelity and practical complexity.

How is a tuned equation of state validated?

A tuned equation of state is validated against measurements not merely by reducing regression error, but by checking phase behavior, physical trends, density, saturation pressure, experiment matches, parameter reasonableness, sensitivities, and performance for the intended engineering use.

Conclusion

Participants take back a Reservoir Fluid Model File containing sample and PVT checks, component characterization, EOS setup, regression evidence, validation plots, sensitivities, uncertainty, limitations, and export controls. The file creates a traceable route from laboratory evidence to an engineering fluid description. It supports clearer model review and more reliable use across reservoir, production, and process studies.

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