TETRA TECH RPS ENERGY | TRAINING

EC024: Reservoir Modelling and Simulation

Format and Duration
Self-Paced - 4 Hours

Summary

This course introduces the fundamentals of building and using 3D reservoir models and simulation in oil and gas field development. You will learn the modelling workflow, how structural and stratigraphic frameworks are constructed, facies modelling methods, and the role of upscaling. The course also covers reservoir simulation principles, fit-for-purpose model design, forces acting on fluids, pseudo-relative permeability, and fluid types. Finally, practical applications are explored, forming development plans, selecting recovery methods, and using modelling to identify and mitigate geological risks that can reduce field size or raise costs. Emphasis is placed on data-driven decisions and understanding how modelling choices impact outcomes and uncertainty.

Learning Outcomes

Participants will learn to:

1. Explain the purpose and components of 3D reservoir models and how they support oilfield evaluation and planning.
2. Describe the end-to-end reservoir modelling workflow and identify key data inputs and decision points.
3. Construct and evaluate structural and stratigraphic frameworks for reservoir geomodelling.
4. Compare facies modelling methods and justify appropriate choices for different reservoir settings.
5. Explain upscaling, its impact on simulation results, and when to apply it.
6. Define fit-for-purpose reservoir simulation and outline steps to match models to historical production data.
7. Describe forces acting on reservoir fluids, pseudo-relative permeability, and how fluid properties influence recovery.
8. Use modelling and simulation outputs to inform development plans and select suitable recovery methods.
9. Identify common geological risks that degrade field performance and propose modelling-based mitigation strategies.

Training Method

This is a self-paced e-learning course, consisting of 4 modules. Within each module the learning materials are structured into short sections, each including interactive text and image content, animations, video, and audio. Each module has a scored quiz at the end to provide the learner with their learning progress. This course has a learning time of approximately 4 to 6 hours.

Who Should Attend

This course is aimed at geoscientists and reservoir engineers who are involved in the development and application of reservoir models in field development

Course Content

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Instructor(s):

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Key Concepts in Reservoir Modelling and Simulation

Reservoir modelling creates 3D representations of hydrocarbon reservoirs by integrating geology, petrophysics, geophysics, fluid properties and engineering. This module explains its purpose, the importance of geological heterogeneity, reservoir geometry classifications, and the connection between geomodelling and flow simulation to support evaluation, production forecasting, and uncertainty assessment.

The Reservoir Modelling Process

The Reservoir Modelling Process outlines the steps to build 3D reservoir models, highlighting data inputs and decision impacts. This module covers workflow stages, constructing structural and stratigraphic frameworks, upscaling and its importance, facies modelling methods, and current limitations in geomodelling practice and functionality.

Reservoir Simulation

Reservoir Simulation uses computer models to predict fluid flow and reservoir performance. This module explains fit-for-purpose model design, key simulation objectives, forces acting on reservoir fluids, the role of pseudo-relative permeability, and the types and properties of fluids encountered, enabling accurate matching of historical data and future behaviour forecasting.

Reservoir Model Applications

This module demonstrates how modelling and simulation guide oilfield development and recovery-method selection. It covers creating development plans, different recovery types, and how rigorous modelling identifies and mitigates geological risks that can make fields smaller or more costly than expected, improving decision-making and outcomes.