Reservoir Modeling for Geologists & Engineers

RSE008

Course Description

This course is designed for geologists, reservoir engineers, and professionals involved in the exploration and development of oil and gas reservoirs. Participants will gain an in-depth understanding of reservoir modeling techniques, including the integration of geological, petrophysical, and engineering data to create accurate models of subsurface reservoirs. The course covers both static and dynamic reservoir modeling, with a focus on simulation and production forecasting. Participants will learn how to use reservoir models to make informed decisions regarding field development, optimization, and production strategies.

Course Objectives

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

- Understand the principles of reservoir modeling and its importance in reservoir management.
- Integrate geological, petrophysical, and engineering data into reservoir models.
- Develop static reservoir models for understanding reservoir geometry and properties.
- Create dynamic models for simulating reservoir behavior and production forecasting.
- Apply reservoir simulation to predict production performance under different scenarios.
- Analyze and interpret model results to optimize field development strategies.
- Understand uncertainty analysis and its role in improving reservoir model reliability.

Who Should Attend

- Geologists, reservoir engineers, and petrophysicists involved in reservoir modeling and management.
- Professionals involved in reservoir characterization, simulation, and field development.
- Project managers, technical leaders, and decision-makers overseeing reservoir management strategies.
- Anyone seeking to gain a deeper understanding of the techniques and tools used in reservoir modeling.

Course Duration

5 Working Days

Course Outlines

1. Introduction to Reservoir Modeling
    - Overview of reservoir modeling: purpose, applications, and importance.
    - Key components of reservoir models: geological, petrophysical, and engineering data.
    - Understanding the integration of data for creating accurate reservoir models.
2. Geological Reservoir Modeling
    - Data collection: core samples, seismic data, well logs, and geological maps.
    - Building static models: defining reservoir structure, stratigraphy, and facies distribution.
    - Integrating geological data into reservoir models to define reservoir boundaries.
3. Petrophysical Modeling
    - Understanding petrophysical properties: porosity, permeability, saturation, and fluid properties.
    - Using well log data to create petrophysical models.
    - Petrophysical modeling techniques: upscaling, interpolation, and averaging.
4. Static Reservoir Models
    - Building a static model: geometry, facies, and petrophysical properties.
    - Determining reservoir heterogeneity and its impact on modeling.
    - Sensitivity analysis: understanding how model assumptions affect results.
5. Dynamic Reservoir Modeling and Simulation
    - Principles of reservoir simulation: fluid flow, pressure, and temperature.
    - Developing dynamic models to simulate reservoir behavior over time.
    - Using dynamic models for production forecasting and well optimization.
    - History matching: calibrating the model to match historical production data.
6. Production Forecasting and Optimization
    - Using reservoir models to predict future production and evaluate different production strategies.
    - Enhancing production forecasting with advanced simulation techniques.
    - Identifying optimal well placements and development plans based on simulation results.

7. Uncertainty Analysis in Reservoir Modeling
    - Understanding uncertainty in geological, petrophysical, and engineering data.
    - Techniques for performing uncertainty analysis in reservoir models.
    - Incorporating uncertainty into decision-making for field development and production planning.
8. Advanced Reservoir Modeling Techniques
    - Integrated reservoir modeling: coupling geological, geophysical, and engineering models.
    - Time-lapse modeling: integrating production history and data over time.
    - Enhanced oil recovery (EOR) simulation and its impact on reservoir modelin