Training Course on Advanced Reservoir Characterization and Modeling

Professional Development Training Course Outline

Category	Oil and Gas	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Reservoir characterization and modeling have become indispensable in modern petroleum engineering and geosciences. As exploration environments become increasingly complex, understanding reservoir behavior through advanced characterization techniques is essential. Training Course on Advanced Reservoir Characterization & Modeling provides participants with cutting-edge techniques and methodologies for accurately defining and modeling reservoirs using integrated data from geology, geophysics, petrophysics, and engineering. With strong emphasis on high-resolution seismic interpretation, rock physics, and dynamic data integration, participants will be equipped to make high-impact decisions in reservoir development and management.

This hands-on training will expose attendees to emerging technologies such as machine learning in reservoir modeling, advanced static and dynamic modeling, real-time reservoir monitoring, and uncertainty analysis. Through interactive lectures, field-based case studies, and industry-proven tools, this course empowers professionals to optimize hydrocarbon recovery, enhance reservoir performance forecasting, and minimize geological risks. Keywords like geological modeling, 3D reservoir simulation, digital oilfield technologies, and AI-driven reservoir analysis are at the core of this course content, ensuring up-to-date relevance and real-world applicability.

Programme Curriculum

Training Course on Advanced Reservoir Characterization & Modeling

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Course Objectives

1. Understand and apply integrated reservoir characterization techniques.
2. Use AI and machine learning tools in reservoir data interpretation.
3. Perform geostatistical modeling for heterogeneous reservoirs.
4. Integrate seismic, well log, and production data for multi-scale modeling.
5. Improve reservoir performance through dynamic modeling and history matching.
6. Analyze petrophysical data for accurate reservoir properties estimation.
7. Create and validate 3D static reservoir models.
8. Apply uncertainty quantification in reservoir simulation.
9. Leverage digital twin technology for reservoir monitoring.
10. Conduct sensitivity analysis in production forecasting.
11. Assess fractured reservoir behavior using simulation tools.
12. Explore the impact of enhanced oil recovery (EOR) methods through modeling.
13. Utilize real-time data for continuous model calibration and decision-making.

Target Audiences

1. Petroleum Engineers
2. Reservoir Engineers
3. Geoscientists
4. Petrophysicists
5. Geologists
6. Technical Managers
7. Field Development Planners
8. Data Scientists working in energy and oil & gas

Course Duration: 10 days

Course Modules

Module 1: Fundamentals of Reservoir Characterization

- Key components of reservoir characterization
- Types of reservoirs and rock properties
- Data types: geological, geophysical, petrophysical
- Interpretation of core and well log data
- Introduction to modeling software tools
- **Case Study: Characterization of a sandstone reservoir in the Middle East**

Module 2: Seismic Data Interpretation

- Seismic attributes and inversion
- Mapping structural and stratigraphic features
- Time-to-depth conversion techniques

- Seismic facies classification
- Role of 4D seismic in reservoir monitoring
- **Case Study: Offshore deep-water seismic reservoir delineation**

Module 3: Petrophysical Data Analysis

- Log interpretation basics
- Porosity, permeability, and saturation calculation
- Core-log correlation techniques
- Net pay estimation
- Rock typing and electrofacies
- **Case Study: Petrophysical analysis in a carbonate reservoir**

Module 4: Static Reservoir Modeling

- Building geological frameworks
- Property modeling using kriging and SGS
- Facies modeling techniques
- Model upscaling and quality control
- Tools: Petrel, RMS
- **Case Study: 3D static modeling of an onshore oilfield**

Module 5: Dynamic Reservoir Simulation

- Principles of flow simulation
- Model initialization and calibration
- Relative permeability and capillary pressure
- Grid generation and optimization
- Material balance and pressure history
- **Case Study: History matching in a North Sea reservoir**

Module 6: Uncertainty and Risk Analysis

- Types of uncertainties in modeling
- Probabilistic vs deterministic approaches
- Monte Carlo simulation
- Tornado and spider plots
- Decision-making under uncertainty
- **Case Study: Risk analysis in reservoir development planning**

Module 7: Machine Learning in Reservoir Modeling

- Introduction to ML tools in geoscience
- Data pre-processing and feature engineering
- Supervised learning for porosity prediction
- Clustering facies from logs
- Python and TensorFlow for modeling
- **Case Study: AI-driven facies prediction in unconventional plays**

Module 8: Fractured Reservoir Characterization

- Identifying natural fractures
- Dual-porosity modeling approaches
- Fracture network simulation
- Rock mechanics and stress field analysis
- Integration with production data

- **Case Study: Fractured basement reservoir in Southeast Asia**

Module 9: Geostatistical Modeling Techniques

- Variogram analysis and modeling
- Sequential Gaussian simulation
- Indicator kriging
- Model validation techniques
- Stochastic vs deterministic methods
- **Case Study: Variogram-based modeling of a heterogeneous reservoir**

Module 10: Enhanced Oil Recovery (EOR) Modeling

- Chemical, thermal, and gas EOR methods
- Screening for EOR applicability
- Reservoir model adaptation for EOR
- Simulation of EOR processes
- Performance prediction and evaluation
- **Case Study: Polymer flooding simulation in a mature reservoir**

Module 11: Digital Twins and Smart Fields

- Concept of digital twin in reservoir management
- Real-time sensor integration
- Predictive analytics in smart fields
- Cloud-based simulation and data sharing
- Benefits and implementation challenges
- **Case Study: Digital twin deployment in a shale reservoir**

Module 12: Integration of Multidisciplinary Data

- Geological, geophysical, and engineering data fusion
- Cross-discipline workflows
- Automated data interpretation tools
- Integrated reservoir studies
- Collaborative model building
- **Case Study: Multidisciplinary integration in a giant oilfield**

Module 13: Production Forecasting and Planning

- Decline curve analysis
- Material balance and nodal analysis
- Use of simulators for forecasting
- Scenario planning
- Uncertainty in forecasts
- **Case Study: Production planning for a deep reservoir**

Module 14: Reservoir Monitoring and Surveillance

- Techniques: PLT, 4D seismic, pressure tests
- Real-time production data analytics
- Flow assurance and well performance
- Model updating using surveillance data
- KPI dashboards and performance indices
- **Case Study: Surveillance program in a brownfield**

Module 15: Field Development and Economic Evaluation

- Reservoir economics fundamentals
- Linking models to financial metrics
- Scenario comparison and ranking
- Net present value (NPV) and IRR analysis
- Development optimization using model results
- **Case Study: Integrated field development planning in West Africa**

Training Methodology

- Interactive instructor-led lectures
- Hands-on software-based modeling exercises
- Group discussions and real-life problem-solving
- Use of real-world case studies for contextual learning
- Pre- and post-assessments to measure knowledge gain
- Digital materials and continuous access to online resources

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

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