

TRAINING TITLE

ADVANCED CARBONATE RESERVOIR CHARACTERIZATION AND MODELLING

Training Duration

5 days

Training Venue and Dates

DE111	Advanced Carbonate Reservoir Characterization and Modelling	5	13-17 Jan. 2025	\$5,750	Dubai, UAE
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In any of the 4 or 5-star hotels. The exact venue will be informed later.

Training Fees

- \$5,750 per participant for Public Training includes Materials/Handouts, tea/coffee breaks, refreshments & Lunch

Training Certificate

Define Management Consultants Certificate of course completion will be issued to all attendees.

TRAINING DESCRIPTION

This interdisciplinary course integrates modern reservoir modelling and reservoir engineering concepts to address and overcome the key challenges encountered when creating meaningful static and dynamic reservoir models of (fractured) carbonate reservoirs across a range of subsurface reservoir applications that support the transition to a sustainable low-carbon energy future.

TRAINING OBJECTIVES

By end of course participants will be able to understand

- Evaluate Carbonate Reservoir Heterogeneity
- Carbonate Petrophysics and Reservoir Properties
- Reservoir Modeling Techniques for Carbonates
- Advanced Seismic and Well Log Interpretation
- Fractured Carbonate Reservoirs
- Reservoir Simulation and Flow Modeling
- Risk and Uncertainty Analysis in Carbonate Reservoir Modeling
- Case Studies and Practical Applications
- Integration of Multidisciplinary Data
- Latest Trends and Technologies in Carbonate Reservoirs
- Understand Carbonate Reservoir Geology and Formation

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WHO SHOULD ATTEND?

- Reservoir Engineers
- Geologists
- Geophysicists
- Petro physicists
- Reservoir Modelers
- Production Engineers
- Well-log analyst
- Fractured Reservoir Specialists
- Asset Managers and Decision Makers
- Consultants and Researches

TRAINING METHODOLOGY

A highly interactive combination of lectures and discussion sessions will be managed to maximize the amount and quality of information and knowledge transfer. The sessions will start by raising the most relevant questions and motivating everybody to find the right answers. You will also be encouraged to raise your own questions and to share in the development of the right answers using your own analysis and experiences. Tests of multiple-choice type will be made available on daily basis to examine the effectiveness of delivering the course.

Very useful Course Materials will be given.

- 30% Lectures
- 30% Workshops and work presentation
- 20% Group Work& Practical Exercises
- 20% Videos& General Discussions

COURSE PROGRAM

Day 1: Introduction to Carbonate Reservoirs and Their Complexity

1. Course Introduction and Objectives
 - Overview of the course structure and learning goals.
 - Introduction to the importance of carbonate reservoirs in the oil and gas industry.
2. Geological Fundamentals of Carbonate Reservoirs
 - Carbonate rock types and depositional environments (reefs, platforms, basins).
 - Diagenesis and its impact on porosity and permeability.
 - Facies models: Key depositional and diagenetic facies in carbonates.

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- Understanding carbonate reservoir heterogeneity (e.g., facies, fractures, porosity types).
- Role of diagenesis, vugs, and fractures in creating reservoir heterogeneity.
- Techniques to assess and characterize carbonate heterogeneity (core analysis, well logs).

Day 2: Petrophysical Characterization of Carbonate Reservoirs

1. Petrophysics of Carbonates

- The unique petrophysical properties of carbonate rocks (porosity, permeability).
- Challenges in carbonate porosity-permeability relationships (vugs, fractures, and matrix).
- Methods for measuring and analyzing carbonate reservoir properties (core analysis, logs, NMR).

2. Advanced Core Analysis Techniques

- Overview of cutting-edge techniques in core analysis for carbonates.
- The use of high-resolution core analysis (X-ray CT, mercury injection capillary pressure).

- Log analysis techniques for carbonate reservoirs.
- Special considerations in interpreting porosity, permeability, and fluid saturations in carbonates.
- Identifying and correcting for the challenges posed by carbonate lithologies.

Day 3: Carbonate Reservoir Modeling and Geostatistics

1. Introduction to Reservoir Modeling

- Overview of static and dynamic modeling for carbonate reservoirs.
- Key challenges in modeling carbonate reservoirs: heterogeneity, fractures, diagenetic variations.
- Geological modeling software and tools for creating accurate carbonate reservoir models.

2. Geostatistics and Data Integration

- Introduction to geostatistical methods (kriging, stochastic modeling).
- Integration of geological, petrophysical, seismic, and well data.
- Building geologically consistent models using multi-disciplinary data.

- Techniques for building facies models in carbonate reservoirs.
- Use of seismic data and geophysical attributes in facies modeling.
- Incorporating geological and petrophysical data into the facies model.

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Day 4: Advanced Reservoir Simulation and Fractured Reservoirs

1. Reservoir Simulation in Carbonates

- Principles of dynamic reservoir simulation for carbonate reservoirs.
- Incorporating heterogeneity, fractures, and diagenesis into flow models.
- Simulation of fluid flow in complex carbonate reservoirs (including fractured and vuggy reservoirs).

2. Fractured Carbonate Reservoirs

- Characteristics and challenges of fractured carbonate reservoirs.
- Identifying fracture networks and their impact on reservoir flow.
- Modeling fractured reservoirs: techniques and tools.

- EOR methods in carbonate reservoirs (e.g., CO₂ injection, waterflooding, chemical flooding).
- Simulation and optimization of EOR in fractured or heterogeneous carbonates.

Day 5: Uncertainty, Risk Analysis, and Case Studies

1. Uncertainty and Risk in Carbonate Reservoirs

- Sources of uncertainty in carbonate reservoir models (geological, petrophysical, fluid flow).
- Quantifying and managing uncertainty using probabilistic methods and sensitivity analysis.
- Best practices for model validation and updating.

2. Managing Uncertainty in Reservoir Prediction

- Methods to reduce uncertainty in model predictions (data assimilation, monitoring).
- Decision-making under uncertainty: Optimizing development and production strategies.

- Detailed case studies of real-world carbonate reservoir challenges.
- Reviewing successful and unsuccessful reservoir modeling projects.
- Lessons learned from case studies across different geological settings.

4. Course Wrap-Up and Q&A

- Review of key learnings from the course.
- Open forum for questions and discussion.
- Final thoughts on applying the course knowledge in participants' specific roles.

NOTE:

Pre-& Post Tests will be conducted.

Case Studies, Group Exercises, Group Discussions, Last Day reviews, and assessments will be carried out.

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