Introduction

This training course on **Integrated Formation Evaluation in Clastic and Carbonate Reservoirs** provides participants with in-depth knowledge of oil and gas well log analysis, along with integrated formation evaluation procedures. It covers the physical principles behind logging tools and offers a comprehensive interpretation process for accurate reservoir characterization.

Understanding carbon reservoirs, both clastic and carbonate, is key in evaluating petrophysical properties and the process of carbon sequestration. The course focuses on integrating these concepts and applying them in formation evaluation to assess reservoir characteristics more effectively.

Targeted Competencies

By the end of this training, participants will:

- Understand the significance of enhanced reservoir characterization in-field evaluations.
- Learn advanced formation evaluation methods and processes.
- Perform quality control and assurance before integrating log analysis results into static and dynamic modeling.
- Utilize NMR data for reservoir fluid characterization and integrate oil and gas well test results.
- Conduct full petrophysical assessments for new exploration blocks and border regions.

Target Audience

This course is ideal for professionals in the following roles:

- Petrophysicists/Log Analysts
- Geologists
- Reservoir Engineers
- Geophysicists
- Geomodellers

Course Objectives

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

- Understand the theoretical frameworks and petrophysical applications of logging tools.
- Accurately interpret petrophysical data for clastic reservoirs.
- Integrate core analysis with traditional or advanced log procedures.
- Develop reservoir models for electrifiers and permeability.

- Characterize reservoir fluid and pore volume in both clastic and carbonate reservoirs.

Course Content Breakdown

Unit 1: Formation Evaluation and Introduction to Logging Tools

- Lithology Equipment: Understanding tools used to assess lithology.
- Porosity Measurement Tools: Methods for measuring porosity in reservoirs.
- Resistivity Tools: Overview of tools used for resistivity measurement.
- Invasion History: Study of fluid invasion into the reservoir.
- Clastic and Carbonate Reservoirs: Key differences between clastic and carbonate reservoirs and their implications for formation evaluation.

Unit 2: Petrophysical Evaluation and Geosteering in Reservoir Development

- Log Normalization and Depth Matching: Techniques for adjusting logs for depth and normalization.
- Cross Plotting: Detecting lithology, porosity, and mineralogy through cross plots.
- Shale Volume Calculation: Determining shale content in the reservoir.
- Resistivity of Water: Understanding how to calculate resistivity for water in various formations.
- Saturation Calculation: Estimating saturation in clean and shaly reservoirs.
- Petrophysical Analysis of Horizontal and Deviated Wells: Examining well deviations and their effect on petrophysical analysis.

Unit 3: Core Analysis

- Data Analysis: Interpreting core data and identifying reservoir heterogeneity.
- Flow Zone Indicator (FZI): Using FZI and the Rock Quality Index (RQI) for reservoir evaluation.
- Facies Models: Exploring different facies models in the reservoir.
- Permeability and Electrification Modeling: Techniques for modeling permeability and electrification in reservoirs.
- Core Data Integration: Merging wireline and LWD logs with core data for a comprehensive analysis.

Unit 4: Nuclear Magnetic Resonance (NMR)

- NMR Tool Theory: Understanding the principles behind NMR tools.
- NMR Log Recognition: Identifying and interpreting NMR logs.
- Advanced NMR Applications: Exploring advanced uses of NMR in formation evaluation.
- Workflow for NMR Interpretation: Step-by-step guide for integrating NMR data into formation evaluation.

- Facies Identification from NMR: Using NMR data to identify different facies in the reservoir.

Unit 5: Modeling of Saturation Height

- Capillary Pressure Concepts: Understanding capillary pressure and its impact on reservoir analysis.
- Capillary Pressure Curve Variations: Analyzing variations in the capillary pressure curve.
- Free Water Level and Oil-Water Contact: Understanding these key parameters and their role in reservoir modeling.
- Saturation Height Modeling: Techniques for modeling saturation height in clastic and carbonate reservoirs.
- Simulation of Saturation Height: Practical exercises in modeling saturation height under varying reservoir conditions.

Conclusion

Upon completing the **Integrated Formation Evaluation in Clastic and Carbonate Reservoirs** course, participants will have a comprehensive understanding of how to integrate data from various sources to evaluate reservoir characteristics effectively. They will be equipped with the tools to conduct advanced petrophysical analysis, apply NMR data, and optimize formation evaluation processes, ultimately enabling them to make informed decisions in reservoir management and development.