Course Overview

The **Integrated Formation Evaluation in Clastic and Carbonate Reservoirs** training course offers participants a comprehensive understanding of the methodologies and tools used in oil and gas well log analysis, with a focus on integrated formation evaluation. This course provides in-depth insights into both clastic and carbonate reservoirs, covering essential concepts like petrophysical analysis, reservoir characterization, and advanced interpretation procedures. Participants will gain an integrated understanding of how to apply formation evaluation techniques for enhanced reservoir characterization, particularly in the context of carbon reservoirs and the process of carbon sequestration.

Targeted Groups

This course is ideal for:

- **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 uses of logging tools.
- Interpret petrophysical data for **clastic reservoirs** thoroughly.
- Integrate core analysis into procedures for traditional or advanced logs.
- Develop reservoir modeling for **electrical resistivity** and **permeability**.
- Characterize **reservoir fluid** and **pore volume** effectively.

Targeted Competencies

Upon completing this course, participants will be able to:

- Recognize the significance of enhanced **reservoir characterization** in field evaluation.
- Learn about sophisticated **formation evaluation** methods and processes.
- Conduct **quality control** and assurance before integrating log analysis into static and dynamic models.
- Utilize **NMR data** for characterizing reservoir fluid and integrating oil and gas well test findings.
- Perform full **petrophysical assessment** for new blocks and border regions (exploration petrophysics).

Course Content

Unit 1: Formation Evaluation and Introduction to Logging Tools

This unit introduces the fundamental tools and equipment used in formation evaluation:

- **Lithology** equipment and techniques.
- Tools for measuring **porosity** and **resistivity**.
- Understanding **invasion history** in well logs.
- Key differences between **clastic** and **carbonate reservoirs**.

Unit 2: Petrophysical Evaluation and Geosteering in Reservoir Development

This unit covers advanced techniques for evaluating reservoir properties:

- **Log normalization**, **depth matching**, **splicing**, and **QC/QA** for logs.
- Detecting **lithology**, **porosity**, and **mineralogy** using cross plots.
- Calculating shale volume and porosity in both clean and shaly formations.
- Evaluating **resistivity** and **saturation** in clean and shale reservoirs.
- Utilizing core analysis to determine **saturation exponent** and **cementation factor**.
- Petrophysical studies for **horizontal** and **deviated wells**.

Unit 3: Core Analysis

This unit focuses on understanding and analyzing core data:

- Data analysis techniques for identifying **reservoir heterogeneity**.
- Utilizing **Flow Zone Indicator** and **Rock Quality Index**.
- Modeling of **reservoir permeability** and **electrification**.
- Practical exercises for advanced reservoir appraisal using accurate core data.
- Integration of **wireline** and **LWD logs** with core data for comprehensive analysis.

Unit 4: Nuclear Magnetic Resonance (NMR)

Participants will explore the use of NMR in formation evaluation:

- **NMR tool theory** and its application in petrophysical analysis.
- Identifying and interpreting **NMR logs**.
- Advanced uses of NMR in evaluating reservoir properties.
- Workflow for **NMR interpretation** and **integration** with core and traditional logs.
- **Facies identification** from NMR data.

Unit 5: Modeling of Saturation Height

This unit delves into the modeling of saturation height and capillary

pressure:

- The concept of **capillary pressure** and its significance in reservoir evaluation.
- Analyzing **capillary pressure curve** variations.
- Modeling **saturation height** and its application in reservoir characterization.
- **Simulation models** of saturation height for both clastic and carbonate reservoirs.

Conclusion

Upon completion of the **Integrated Formation Evaluation in Clastic and Carbonate Reservoirs** course, participants will have developed the skills and expertise to conduct thorough petrophysical evaluations, integrate core and well log data, and model reservoirs accurately. This training will equip them with the necessary competencies to perform advanced formation evaluations, enhance reservoir characterization, and integrate NMR data and traditional log analysis into dynamic modeling.