

# Petrophysics for Drilling Engineers



## Table of Contents:

- Introduction
- Objectives
- Who should attend?
- Course Outline



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## Introduction:

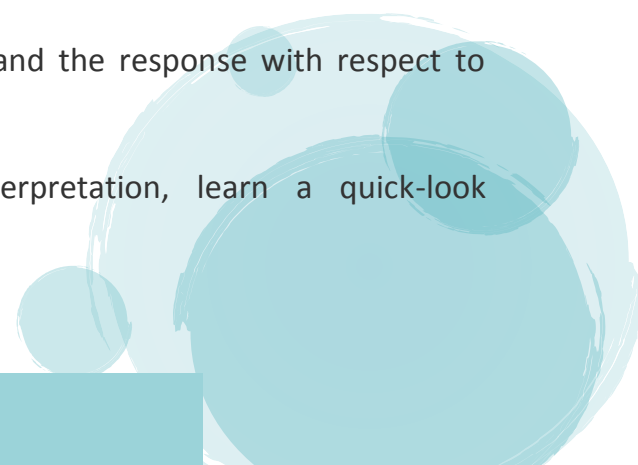
**Petrophysics** is a key discipline in petroleum exploration and production. This course covers wireline logging, MWD-LWD and their specific applications for wellbore stability. This course will be suitable for all drilling engineers, directional drillers and other geoscientists associated with drilling.

### The main objectives of this course are to understand:

- The petrophysical properties and corresponding logging methods
- The fundamentals of log interpretation and formation evaluation
- The link between Petrophysics and seismic reservoir characterization tools

## Objectives:

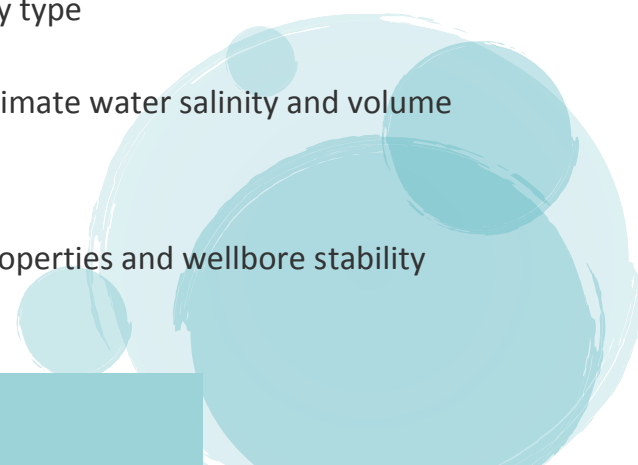
### By the end of this course delegates will learn about:

- The importance of Petrophysics in the workflow of reservoir evaluation and characterization
  - The physical reservoir properties (porosity, saturation, fluids, permeability) required for clastics and carbonate rock evaluation
  - The physical background of well logging methods and the response with respect to reservoir characterization
  - Understand fundamental techniques of log interpretation, learn a quick-look interpretation
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## Who should attend?

Drilling Engineers, Senior Drilling Engineers, Drilling Supervisors, Workover Engineers, Petroleum Engineers, Completion Engineers, Tool Pushers, Reservoir and Senior Reservoir Engineers, Geologists, Production Engineers & technologists, Wellsite Engineers, Lifting Personnel, Maintenance Engineers, Foremen, Industry Personnel

## Course Outline:

- Reservoir Rock and Life of a well
  - Tool Conveyance, Depth Control
  - Well bore stability and filtrate diameter of invasion
  - The mud log and its applications
  - Basics of Logging
  - Log Quality Control
  - GR Spectroscopy and its application to determine clay type
  - The Spontaneous Potential and its applications to estimate water salinity and volume of shale
  - Acoustic Log: secondary porosity, rock mechanical properties and wellbore stability
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- The density and photoelectric cross section
  - The Neutron Log, neutron spectroscopy and sigma neutron capture cross-section
  - Density-Neutron applications for lithology, shale volume and effective and total porosities
  - Basics of Resistivity and the Archie Equation
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- The concept and applications of the Formation Factor (FF) as a variable  $m$  emulator
  - Resistivity measurements in the invaded zone (RXO)
  - Resistivity measurements in the uninvaded zone using Induction and Laterolog
  - The concept and applications of array resistivity measurements
  - Wireline Formation Testing
  - Measurement While Drilling (MWD) and Logging While Drilling (LWD)
  - Data acquisition of porosity, lithology, Pulsed Neutron Sigma and resistivity
  - Formation Pressure
  - Geosteering basics
  - Seismic
  - Acoustic



- Shale Volume ( $V_{sh}$ ,  $V_{cl}$ ) evaluation and clay type- Dispersed or laminated shales
  - Estimating the parameters of "m" and "n" in the Archie Equation,
  - Quick look techniques to estimate the oil / water, gas/water and oil/gas contacts,
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- Salinity estimations of formation water and filtrate water,
  - Estimation of porosity, lithology and water saturations in clean and in shaly-sands

