

---

## Summary

This course provides detail on the integration of the various open-hole logs into a robust qualitative and quantitative analysis of the subsurface. In combination with the Foundation and 'Tools' courses, the overarching objective is to increase familiarity with the language, concepts, and tools used in the field of petrophysics and their interpretation.

## Learning Outcomes

Participants will learn to:

1. Describe how petrophysical logs and other data are integrated to complete a robust analysis through formation evaluation.
2. Understand the difference between continuous and discrete properties and how these can be described in the context of the 'Petrophysical Model'.
3. Appreciate how special lithologies such as coal are identified and their importance to the Petrophysical Model.
4. Learn about the density neutron combination and how to read a typical density neutron cross-plot.
5. Consider alternate cross-plots using different log data.
6. Consider the importance of integration and iteration of estimates of shale volume, porosity, and saturation and how these can be used to help define 'NET' and 'PAY'.

## Training Method

This is a self-paced e-learning course. Learning materials are structured into short sections, each including interactive text and image content, animations, video and audio. An end of course quiz is scored to provide the learner with their learning progress. Approximately 3 hours learning time.

## Who Should Attend

This course is for geoscientists and engineers with an understanding of the fundamentals of petrophysics and of petrophysical tools, who wish to carry out a formation evaluation. Prerequisites for this course are EC013 (Foundation Petrophysics), which introduces the principles and concepts that underpin traditional petrophysical analysis, and either EC014 (Petrophysical Tools), EC015 (Petrophysical Tools for Geoscience), or EC016 (Petrophysical Tools for Reservoir Engineering).

## Course Content

### The Petrophysical Model: Lithology and Special Minerals

In this module we introduce the concept of data integration and the generation of a 'Petrophysical Model'. We look at how the identification of special minerals such as coal and halite can help in the understanding of a basin and how these are handled within the context of the model. Finally the learner will be introduced to the density neutron combination and appreciate how this is a powerful tool to use during a petrophysical formation evaluation project.

---

### Density-Neutron Combination Advanced

In this module we deepen our understanding of how the density and neutron logs can be used in combination to estimate shale volume and other properties for the petrophysical model. We examine how to read a typical density-neutron cross-plot and how to interpret shale volume and porosity from them.

### Formation Evaluation: Integration & Averaging

In this module we will understand the importance of integrating all log data in deriving the petrophysical model and reflect on the interaction between parameters and a need for an iterative process. We will then consider the concepts of NET, PAY and averaging in petrophysical analysis. Finally we will explore the potential for a downhole measurement of permeability.