

## N528: Petrophysics of Tight and Unconventional Oil Reservoirs

Instructor(s): Dick Merkel

### Format and Duration

Classroom - 3 Days

Virtual - 5 Sessions

---

### Summary

**Business Impact:** Application of the learnings of this course will empower participants to understand the petrophysical concepts to allow for determination of flow units and hydrocarbons in place (HIP) in mixed or oil wet formations.

Unconventional reservoirs are typically dual porosity and dual permeability, which often forces petrophysical modeling into two-dimensional analysis. This course explores how the physical and chemical nature of mudstones constrains our petrophysical approach and how core, log, image, and geochemical data can be integrated to develop an appropriate petrophysical evaluation workflow. The analysis can be applied to pilot wells to determine favorable zones to go horizontal, or to horizontal wells to determine optimum completion intervals.

### Learning Outcomes

Participants will learn to:

1. Evaluate the fluid distribution in unconventional reservoirs.
2. Determine how maturation affects pore distribution and connate water salinity.
3. Distinguish geologic environments that require special logging tools.
4. Select advanced techniques for the analysis of NMR and/or dielectric measurements.
5. Formulate special core analysis techniques to calibrate or verify petrophysical models.
6. Judge pore size distributions in heterogeneous formations.
7. Formulate reservoir wettability from logs and core.
8. Determine with accuracy the amount of clay bound water and free water.

### Training Method

This is a classroom or virtual classroom course comprising a mixture of lectures, demonstrations, and discussions.

### Who Should Attend

Anyone involved in the petrophysical evaluation of shale reservoirs, including geologists, geophysicists, petrophysicists and engineers.

### Prerequisites and Linking Courses

This course has no required prerequisites but assumes a basic understanding of logs and log analysis as presented in N003 (Geological Interpretation of Well Logs). Linking Unconventional Resource classes include Basic level N313 (Evaluating Resource Plays) and Skilled level N250 (Evaluation Methods for Shale Reservoirs).

---

## N528: Petrophysics of Tight and Unconventional Oil Reservoirs

Instructor(s): Dick Merkel

Format and Duration

Classroom - 3 Days

Virtual - 5 Sessions

---

### Course Content

- The Physics of Log Measurements
- Log Normalization, QC, and Measurement Error
- Mineralogy Determination from Logs
- Clay Responses and Clay Bound Water
- TOC Models
- Porosity Determination
- Fluid Saturation; models and measured
- Permeability from core and logs
- Rock Mechanics