# Core Analysis and Reservoir Rock Characterisation: RCAL, SCAL and Carbonate Rock Typing

28 June – 2 July 2027
London - Central London four-star



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**Ref:** 431_13975 **Date:** 28 June – 2 July 2027 **Location:** London - Central London four-star **Fees:** 23000 SAR

## Introduction:

Core analysis is the laboratory ground truth for reservoir rock properties, yet many cored wells return plugs that were poorly preserved, selected without a plan or tested in ways that do not match reservoir conditions, and the results enter models unchecked. This Core Concept course trains subsurface staff to scope coring, handle and sample core, commission routine core analysis RCAL and special core analysis SCAL, quality-check laboratory data, type carbonate and clastic rocks and pass defensible inputs to reservoir models. Participants produce a Core Analysis Programme and SCAL Data QC Sheet.

## Course Objectives:

- Specify coring methods, wellsite handling and preservation steps that protect fluid saturations and rock fabric for the planned tests
- Design a plug sampling plan and core analysis programme that links each laboratory test to a reservoir decision
- Evaluate RCAL porosity, permeability, grain density and Dean-Stark saturation results for cleaning, stress and measurement errors
- Commission and interpret SCAL capillary pressure, wettability, electrical property and relative permeability tests on representative samples
- Classify carbonate pore systems and define petrophysical rock types that link core measurements to log responses
- Deliver a Core Analysis Programme and SCAL Data QC Sheet with rock-typed saturation-height and relative permeability inputs ready for reservoir models

## Target Audience:

- Reservoir engineers who take capillary pressure and relative permeability data into static and dynamic models
- Petrophysicists who calibrate log porosity, permeability and saturation against core measurements
- Development and production geologists who describe core, define facies and plan coring intervals
- Core laboratory coordinators who scope test programmes, follow contractors and review laboratory reports
- Operations geologists who supervise coring runs and wellsite core handling

## Course Outline:

### Day 1: Coring Operations, Core Handling and Laboratory Programme Design

- Conventional, Sponge, Pressure and Sidewall Coring Options Against Data Objectives
- Wellsite Core Handling: Orientation Marking, Wrapping, Freezing and Preservation
- Core Gamma Scanning, CT Imaging and Slabbing for Plug Selection
- Plug Sampling Plan: Horizontal, Vertical and Full-Diameter Samples by Facies
- Core Analysis Programme Scope: Test Matrix, Sample Counts and Laboratory Turnaround

### Day 2: Routine Core Analysis RCAL Measurements and Corrections

- Core Cleaning and Drying Protocols: Soxhlet Extraction and Humidity-Controlled Ovens
- Dean-Stark Fluid Saturation Measurement and Mud Filtrate Contamination Checks
- Helium Porosimetry, Boyle Law Grain Volume and Grain Density Determination
- Steady-State Gas Permeability with Klinkenberg Slip Correction
- Net Overburden Stress Correction of Plug Porosity and Permeability

### Day 3: Special Core Analysis SCAL: Capillary, Wettability, Electrical and Flow Tests

- Mercury Injection, Porous-Plate and Centrifuge Capillary Pressure Methods
- Amott and USBM Wettability Indices with Core Restoration by Crude Oil Ageing
- Formation Factor and Resistivity Index Tests for Cementation and Saturation Exponents
- Unsteady-State and Steady-State Relative Permeability Coreflood Designs
- SCAL Sample Selection from RCAL Porosity-Permeability Clusters

### Day 4: Carbonate Pore Systems, Rock Typing, Reservoir Quality and Core Data QC

- Carbonate Pore Classification: Interparticle, Vuggy and Microporosity Systems
- Petrophysical Rock Typing with Winland R35, Flow Zone Indicator and Pore Throat Size Distributions
- Sandstone Reservoir Quality Controls: Compaction, Cementation and Clay Diagenesis at Overview
- Core Data QC Flags: Plug Damage, Induced Fractures, Grain Density Outliers and Salt Precipitation
- Core-Log Depth Matching and Core-Calibrated Porosity-Permeability Transforms

### Day 5: Case Work: Core Analysis Programme and SCAL Data Package for Reservoir Models

- Multi-Well Carbonate Case: Coring Objectives and Laboratory Test Matrix Definition
- Laboratory Report Review: Capillary Pressure and Relative Permeability Consistency Checks
- Saturation-Height Function Construction from Capillary Pressure by Rock Type
- SCAL Data QC Sheet and Normalised Relative Permeability Tables for Model Input
- Core Analysis Programme Presentation and Peer Challenge

## Skills You Will Gain:

- Coring Programme Planning
- Core Preservation Control
- Plug Sampling Strategy
- Laboratory Data Validation
- Wettability Assessment
- Carbonate Pore Typing
- Petrophysical Rock Typing
- Saturation-Height Modelling

## Why Attend This Course:

- Return with a Core Analysis Programme and SCAL Data QC Sheet for an interval your team plans to core or has already cored
- Spend laboratory budget on the tests and plugs that change reservoir decisions, not on repeated routine measurements
- Detect cleaning damage, stress effects and unrepresentative samples in contractor reports before the numbers reach a model
- Compare core laboratory practice with engineers and geoscientists working carbonate and clastic fields in different basins

## Conclusion:

Reservoir models are only as sound as the rock data behind them, and that data is decided long before a laboratory report arrives. The one week move from coring choices, core handling and plug selection through RCAL measurements and corrections, SCAL capillary, wettability, electrical and flow tests, then to carbonate pore systems, rock typing and data quality checks. The final day applies the workflow to a multi-well case and closes with a Core Analysis Programme and SCAL Data QC Sheet ready for the next coring decision.