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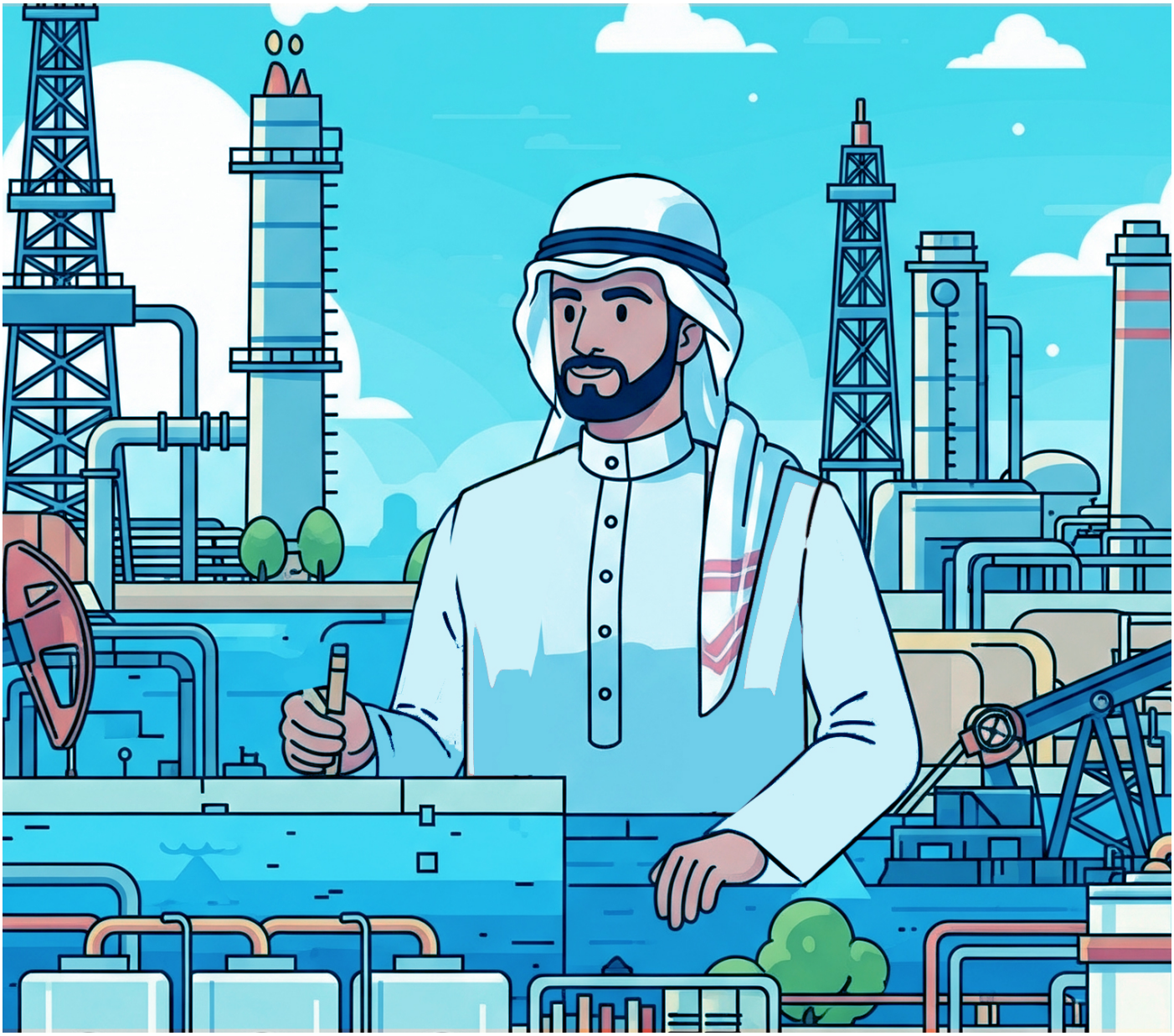

Oil, Gas and Chemical

Introduction of Rock Physics To Support Quantitive Seismic Interpretation

Course Introduction

This course focuses on the construction and application of first-order models in seismic amplitude interpretation and through this promotes the understanding of the essential aspects of rock physics that are relevant in interpreting all types of seismic displays (including reflectivity, impedance and AVO data).

Target Audience

The course is aimed as an introduction to practical rock physics application in seismic interpretation and would be of interest to all working geoscientists including geologists, geophysicists, petrophysicists

The course is designed for all geoscientists including geologists, geophysicists, Petrophysicists and QI Rock Physicist who wish to understand the principles of interpreting seismic data using rock physics models and gain awareness of how this may impact the perception of risk in exploration and production drilling. Attendees will receive a fully documented manual with text discussion, including all illustrations shown in the course.

The course is a combination of lectures and practical exercises – there is no previous experience of the package is required.

Learning Objectives

- Employ simplifications to the Zoeppritz equations and understand why they are useful in describing variation of amplitude with offset and how they are used in seismic modelling and interpretation.
- Categorise AVO responses.

- Appreciate how various rock property factors (such as lithology and fluid fill) affect the contrasts in acoustic properties that give rise to seismic signatures.
- Construct simple single-interface amplitude-versus-angle models and determine first order effects to look for on various seismic displays.
- Calculate the vertical resolution of seismic data.
- Recognise the importance of calibration of seismic to well data, including the issues involved in upscaling log data to the seismic scale, and appreciate the importance of understanding accuracy in well ties.
- Recognise the data sources used for building seismic models and understand the basics behind the application of rock physics models in fluid and lithology substitution.
- Apply Gassmann's equation to evaluate the effect of changing fluids on acoustic properties.
- Comprehend the basics of seismic inversion and the potential pitfalls.
- Understand the basics behind the various approaches to AVO analysis:
- Construct an AVO projection designed to optimise changes in fluid fill.

Course Outline

- **01 Day One**

  Introduction

  - Fundamentals
  - Wave propagation
  - Seismic basics
  - Rocks are isotropic and elastic
  - The convolution model
  - Modelling seismic reflectivity
  - What is the wavelet?
  - What do the trough and peak present?
  - Reflection, refraction and mode conversion
  - Single interface model - the simplest and most important seismic model:
  - Amplitude varing with angle (AVA)
  - Other seismic models
  - Amplitude varing with offset AVO response description
  - Exercises

- **02 Day Two**
  - How can we Qc the tool measurements of Key logs Vp, Vs (Sonic) & Density?
  - Why the Sonic log need processing? How the measurement made by the tool? And converted to slowness?
  - SLB example of STC semblance processing
  - Why the Sonic Scanner SLB is an advantage in the current industry?
  - Sonic Scanner & DSI transducers frequencies
  - QC Sonic data
  - How the measurement made by the Density tool?
  - QC density data
  - Qc and Preparation of the data for Rock Physics.
  - Guidelines for well editing and QC
  - Elastic Bounds:
  - Distinction between cementing and sorting trends
  - Missing log predication
  - Effect of Geology on Rock physics
  - Examples of Xplot Editing, QC analysis and RP trends
- **03 Day Three**
  - Fluid Substitution Analysis
  - The importance of P & S Sonic for Fluid sub. & AVO Modelling.
  - Gassmann Fluid Substitution
  - understanding the theory.
  - Theory and Synopsis.
  - Basic Fluid Substitution- Gassmann’s equation & Work Flow
  - 4 well Examples in Details from Varies Basins
  - Density correction for mud filtrate invasion ■ Why we are doing this density Correction to mud filtrate invasion?
  - Theory
  - Workflow
  - Practical examples test in WBM consolidated/ unconsolidated
  - Conclusion Pros and cons
  - Conclusion of Day 3
- **04 Day Four**
  - Conceptual workflow for forward modelling and inversion
  - QI calibration processes for rock physics and seismic modelling
  - Petrophysical input To QI modelling processes
  - Basic Well Tie Process
  - Synthetic generation
  - What do the trough and peak present?
  - How to obtain the wavelet

- Well Tie approaches using synthetics
- How long is the wavelet optimum length?
- 5 examples of synthetic to well Tie
- Key Conclusion and Observation
- Exercise of QAQC the time/depth data with velocity interval

• **05 Day Five**

- Conceptual Workflow for forward Modelling and inversion
- Comparison between Forward Modelling and Inversion
- Seismic Inversion Benefits
- Seismic Inversion Examples around the world
- Types of Seismic Inversion in Basics
- Relative Impedance
- Coloured Inversion
- Deterministic Inversion
- Stochastic Inversion
- Pre-Inversion Checklist
- Seismic Inversion: Summary

Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
May 25, 2025	May 29, 2025	5 days	4250.00 $	KSA - Riyadh
Aug. 4, 2025	Aug. 8, 2025	5 days	4950.00 $	Turkey - Istanbul
Nov. 23, 2025	Nov. 27, 2025	5 days	4250.00 $	KSA - El Dammam
June 6, 2025	June 10, 2025	5 days	4250.00 $	UAE - Dubai