Advanced Well Log Interpretation Training Course

Professional Development Training Course Outline

Category	Oil and Gas	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Advanced Well Log Interpretation Training Course is designed to empower petroleum professionals with the skills to accurately analyze and interpret well logging data. This training goes beyond basic petrophysical analysis, delving into complex formations, advanced logging tools, and the integration of diverse data sources. By mastering these techniques, participants can unlock a reservoir's full potential, leading to more informed decisions in hydrocarbon exploration and production. This course is crucial for professionals seeking to enhance their expertise in **formation evaluation, reservoir characterization, and petrophysics**, ensuring they stay ahead in the dynamic energy sector.

Our curriculum focuses on practical application and **real-world case studies** to bridge the gap between theoretical knowledge and industry demands. It equips attendees with the ability to perform detailed **quantitative formation evaluation**, handle **complex lithology**, and apply **cutting-edge technologies** like nuclear magnetic resonance (NMR) and borehole imaging. The training emphasizes a holistic approach, integrating data from core analysis, seismic surveys, and well tests to build robust and reliable subsurface models. This advanced understanding is essential for optimizing field development, improving drilling efficiency, and maximizing **hydrocarbon recovery**.

Programme Curriculum

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Course Duration

5 days

Course Objectives

Upon completion of this course, participants will be able to:

1. Master the principles of quantitative formation evaluation and petrophysical analysis.
2. Apply advanced techniques for interpreting logs in complex lithologies, including shaly sands and carbonates.
3. Utilize a wide range of advanced logging tools and their applications in modern exploration.
4. Perform accurate porosity, permeability, and fluid saturation analysis from log data.
5. Integrate log data with core analysis, seismic data, and well tests for holistic reservoir characterization.
6. Identify and troubleshoot common log data acquisition issues and quality control parameters.
7. Evaluate reservoir quality and performance for improved hydrocarbon exploration and production.
8. Understand the principles of unconventional reservoirs, including shale gas and tight sandstones.
9. Interpret borehole imaging logs to identify fractures and structural features.
10. Assess well integrity and fluid contacts using cased hole logging and pulsed neutron tools.
11. Design optimal logging programs tailored to specific geological and operational requirements.
12. Apply machine learning and AI algorithms for automated log interpretation and data analysis.
13. Create robust petrophysical models for reservoir simulation and field development.

Organizational Benefits

- Enhanced accuracy in formation evaluation leads to better-informed decisions regarding drilling, completion, and production.
- Accurate log interpretation minimizes the need for costly and unnecessary logging runs and remedial workovers.
- The ability to characterize reservoirs more precisely helps maximize oil and gas recovery rates and extend the life of a field.
- A deeper understanding of subsurface conditions allows for better assessment and mitigation of geological and operational risks.
- Equipping staff with expertise in cutting-edge logging technologies and data integration provides a significant edge in a competitive market.
- By accurately identifying and quantifying pay zones, companies can book more reserves and increase production volumes.
- Improved well integrity analysis ensures safer operations and helps maintain environmental standards.

Target Audience

1. Petrophysicists and Geologists
2. Reservoir and Petroleum Engineers
3. Drilling and Completion Engineers
4. Well Logging Analysts and Data Scientists
5. Exploration and Production (E&P) Managers
6. Field Operations Supervisors
7. Technical Staff and Geoscience Technicians
8. Academics and Researchers in Petroleum Geosciences

Course Outline

Module 1: Fundamentals of Advanced Petrophysics

- Review of petrophysical concepts: porosity, permeability, saturation.
- Principles of advanced logging measurements and their physical basis.
- **Log quality control** and environmental corrections for reliable data.
- Introduction to complex lithology analysis and shaly sand models.
- **Case Study: "Evaluating a Shaly Sand Reservoir in the Niger Delta"** - Participants will use advanced shaly sand equations to determine accurate hydrocarbon volumes in a known complex geological setting.

Module 2: Advanced Porosity and Saturation Determination

- Detailed analysis of density, neutron, and sonic logs in various lithologies.
- **Nuclear Magnetic Resonance (NMR)** logging for advanced porosity and permeability.
- Advanced water saturation equations for complex reservoirs (e.g., Archie's, Indonesian, Simandoux).
- Understanding capillary pressure and wettability from log data.
- **Case Study: "Unlocking a Carbonate Reservoir's Potential in the Middle East"** - A multi-well data set from a carbonate field will be used to apply a customized workflow for vuggy and fractured porosity estimation.

Module 3: Cased Hole Logging and Well Integrity

- **Pulsed Neutron Logging (PNL)** for reservoir monitoring and fluid saturation changes.
- Cement Bond Logging (CBL) and Ultrasonic Imaging for cement evaluation.
- Production logging tools (PLT) to diagnose flow profiles and identify leaks.
- Corrosion and casing inspection tools.
- **Case Study: "Diagnosing Water Production in an Offshore Well"** - Participants will analyze PLT and PNL data to pinpoint the source of water ingress and recommend a remedial action plan.

Module 4: Borehole Imaging and Structural Analysis

- Principles and interpretation of electrical and acoustic imaging logs.
- Identifying fractures, faults, and structural features from image logs.
- Using image logs for sedimentary facies analysis and depositional environment.
- Integrating image log data with core and seismic data.
- **Case Study: "Characterizing a Fractured Basement Reservoir in Vietnam"** - Participants will interpret borehole images to identify open fractures and use this information to create a fracture network model.

Module 5: Unconventional Reservoirs

- Specialized log interpretation techniques for **shale gas and tight oil**.
- Mineralogy and total organic content (TOC) determination from logs.
- Fracture identification and geomechanical properties for hydraulic fracturing design.
- Log analysis in horizontal wells and multi-lateral completions.
- **Case Study: "Petrophysical Evaluation of a Marcellus Shale Gas Well"** - A comprehensive log suite from a shale well will be used to calculate TOC, matrix properties, and identify brittle zones for optimal frack placement.

Module 6: Integrated Formation Evaluation

- Integrating **core analysis data** (SCAL, RCA) with log data.
- Cross-plot analysis and petrophysical modeling in a multi-disciplinary context.
- **Seismic to well tie** and log-based seismic attributes.
- Fluid contact determination from log and pressure data.
- **Case Study: "An Integrated Study of a Clastic Reservoir in West Africa"** - Attendees will combine well logs, core data, and fluid samples to build a consistent petrophysical model for reserves estimation.

Module 7: Advanced Technologies and Data Analytics

- Introduction to machine learning algorithms for automated facies classification.
- Using **Artificial Intelligence (AI)** for predictive petrophysics.
- Analyzing big data from multiple wells for field-wide reservoir characterization.
- Advanced software applications and workflows.
- **Case Study: "Automating Lithology Classification Using Machine Learning"** - Participants will use a log data set to train a machine learning model to automatically classify lithofacies, comparing the results with a manual interpretation.

Module 8: Practical Well Log Design and Troubleshooting

- Designing fit-for-purpose logging programs.
- Identifying and mitigating common log interpretation pitfalls.
- Peer review of log analysis reports.
- Final project presentation and discussion.
- **Case Study: "Troubleshooting an Apparent Data Conflict"** - Participants will be given a real-world scenario with contradictory data from different logs and must use their knowledge to identify the root cause and provide a corrected interpretation.

Training Methodology

This course employs a dynamic and interactive training methodology to ensure maximum knowledge transfer and skill development. It includes:

- Expert-Led Lectures.
- Hands-on Exercises.
- Real-World Case Studies.
- Interactive Discussions.
- Q&A Sessions.
- Peer-to-Peer Learning.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

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