Training Course on Advanced Geological and Geophysical Interpretation

Professional Development Training Course Outline

Category	Oil and Gas	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

In today’s data-driven energy sector, the ability to precisely interpret geological and geophysical data is a critical skillset. Training Course on Advanced Geological & Geophysical Interpretation is designed to elevate geoscientists, geophysicists, and exploration professionals by deep-diving into subsurface imaging, structural interpretation, and advanced seismic techniques. This course integrates real-world case studies, machine learning applications, and multi-attribute interpretation strategies, making it an industry-leading program for mastering earth sciences.

Participants will gain hands-on knowledge in seismic stratigraphy, reservoir characterization, and geomechanical modeling. Through this training, professionals will not only refine their analytical skills but also strengthen decision-making for resource evaluation, drilling operations, and sustainable field development. Whether you work in petroleum exploration, mining, or environmental geology, this program equips you with the tools to drive actionable insights from complex datasets.

Programme Curriculum

Training Course on Advanced Geological & Geophysical Interpretation

Introduction

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Course Objectives

1. Enhance interpretation skills using 3D seismic data visualization tools.
2. Understand the application of machine learning in geophysical analysis.
3. Apply seismic inversion techniques to reservoir modeling.
4. Integrate remote sensing and geospatial analysis in exploration.
5. Perform accurate fault and fracture identification.
6. Improve lithofacies and stratigraphic correlation methods.
7. Master petrophysical data integration for subsurface evaluation.
8. Use gravity and magnetic data for tectonic analysis.
9. Implement time-depth conversion and velocity modeling.
10. Assess basin modeling for hydrocarbon systems analysis.
11. Apply geostatistical methods in uncertainty quantification.
12. Evaluate unconventional reservoir potential through advanced interpretation.
13. Leverage AI-driven geological modeling tools for better decision-making.

Target Audience

1. Petroleum Geologists
2. Exploration Geophysicists
3. Reservoir Engineers
4. Geotechnical Engineers
5. Environmental Geologists
6. Earth Science Researchers
7. Graduate Geoscience Students
8. Mining and Energy Consultants

Course Duration: 10 days

Course Modules

Module 1: Seismic Data Acquisition & Processing

- Principles of seismic data collection
- Onshore vs offshore acquisition methods
- Noise reduction and filtering techniques
- Time and depth domain processing
- QC workflows for seismic data
- **Case Study:** Offshore deep-water seismic survey optimization

Module 2: 3D Seismic Interpretation Techniques

- Seismic volume navigation
- Horizon picking and fault interpretation
- Multi-attribute analysis
- Structural mapping best practices
- Software demonstration (Petrel or Kingdom)
- **Case Study:** Fault system mapping in a rift basin

Module 3: Seismic Stratigraphy and Facies Analysis

- Sequence stratigraphy principles
- Identification of seismic facies
- Depositional systems interpretation
- Stratigraphic trap recognition
- Integration with well logs
- **Case Study:** Stratigraphic pinch-out trap analysis

Module 4: Structural Geology Interpretation

- Identification of folds, faults, and fractures
- Structural restoration techniques
- Salt tectonics and diapirism
- Use of curvature and coherence attributes
- Application of balanced cross-sections
- **Case Study:** Interpretation of thrust fault systems

Module 5: Seismic Inversion and Rock Properties

- Introduction to inversion methods
- Acoustic and elastic inversion
- Linking inversion to petrophysical data
- Interpreting AI and Vp/Vs maps
- Impedance-based lithology prediction
- **Case Study:** Gas reservoir delineation using seismic inversion

Module 6: Reservoir Characterization Techniques

- Integrated petrophysical evaluation
- Porosity, permeability, and saturation mapping
- Attribute-based reservoir mapping
- Reservoir heterogeneity modeling
- Dynamic reservoir analysis
- **Case Study:** Carbonate reservoir characterization

Module 7: Time-Depth Conversion and Velocity Modeling

- Building velocity models
- Checkshot and VSP calibration
- Interval and RMS velocity analysis
- Depth migration workflows
- Uncertainty analysis in depth conversion
- **Case Study:** Depth imaging in complex geological terrain

Module 8: Geostatistics for Subsurface Interpretation

- Variogram modeling and kriging
- Spatial distribution analysis
- Statistical integration with seismic
- Simulation models for property mapping
- Risk and uncertainty quantification
- **Case Study:** Geostatistical modeling in a shale play

Module 9: Basin Modeling and Thermal Maturity

- Basin evolution analysis

- Heat flow and maturation models
- Burial history reconstruction
- Hydrocarbon generation timing
- Petroleum system modeling
- **Case Study:** Basin model calibration in a frontier area

Module 10: Gravity and Magnetic Methods

- Principles of potential field data
- Reduction to the pole and filtering
- Interpretation of anomalies
- Structural mapping using gravity
- Integration with seismic and well data
- **Case Study:** Basement structure mapping in sedimentary basin

Module 11: Remote Sensing and Satellite Geology

- Types of remote sensing datasets
- Spectral analysis for mineral detection
- Lineament mapping
- Use of drones in geosciences
- GIS integration with geological maps
- **Case Study:** Landslide-prone area monitoring with remote sensing

Module 12: Machine Learning in Geological Interpretation

- Overview of ML techniques (SVM, Random Forest, CNNs)
- Supervised vs unsupervised learning
- Feature engineering from seismic data
- Predictive modeling for lithology
- AI-based seismic interpretation platforms
- **Case Study:** Lithofacies prediction using machine learning

Module 13: Unconventional Resources Interpretation

- Characteristics of shale gas and tight oil plays
- Fracture network analysis
- Sweet spot identification
- Microseismic monitoring
- E&P workflows for unconventionals
- **Case Study:** Hydraulic fracturing optimization in shale reservoirs

Module 14: Environmental and Engineering Geophysics

- Near-surface geophysical methods
- Contaminant plume detection
- Infrastructure and foundation mapping
- Geotechnical site assessments
- Groundwater exploration techniques
- **Case Study:** Landfill site evaluation using geophysics

Module 15: Integrated Geological Modeling

- Combining seismic, geological, and petrophysical data
- Static vs dynamic modeling
- Uncertainty and scenario modeling

- Model validation and history matching
- 3D visualization and decision support
- **Case Study:** Integrated field development model for brownfield

Training Methodology

- Instructor-led interactive sessions
- Real-world case study analysis
- Software demonstrations (Petrel, Kingdom, GeoFrame)
- Hands-on interpretation exercises
- Group discussions and problem-solving workshops
- Pre- and post-assessment quizzes

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	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

Ready to enroll or request a customized program? Book online or contact us:

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