Training Course on Big Data Analytics for Oil and Gas Operations

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

The oil and gas industry is evolving rapidly due to the advent of Big Data Analytics, Artificial Intelligence (AI), Internet of Things (IoT), and predictive maintenance systems. With increasing demand for operational efficiency, risk mitigation, and cost optimization, data-driven decision-making has become a game-changer. Training Course on Big Data Analytics for Oil & Gas Operations is designed to empower professionals with the latest tools, technologies, and methodologies to harness the power of big data for exploration, drilling, production, asset management, and downstream processes.

This program enables participants to acquire hands-on expertise in utilizing machine learning algorithms, cloud-based analytics, real-time data processing, and advanced visualization tools. By incorporating real-world case studies, simulations, and interactive labs, this course bridges the gap between theory and practice—transforming how professionals analyze subsurface data, monitor reservoirs, predict equipment failures, and improve supply chain management.

Programme Curriculum

Training Course on Big Data Analytics for Oil & Gas Operations

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Course Objectives

1. Understand the fundamentals of Big Data and its role in oil and gas digital transformation.
2. Learn how to leverage AI and Machine Learning in upstream and downstream operations.
3. Apply Predictive Analytics for asset integrity and predictive maintenance.
4. Utilize IoT and sensor data for real-time operational insights.
5. Perform data integration and management across heterogeneous sources.
6. Build dashboards and data visualization using advanced tools like Power BI or Tableau.
7. Apply cloud computing solutions for scalable data processing.
8. Analyze seismic data for exploration efficiency.
9. Use geospatial analytics to optimize drilling locations and logistics.
10. Ensure cybersecurity in industrial data analytics environments.
11. Gain practical experience with data lakes, Hadoop, and Spark frameworks.
12. Enhance decision-making with KPIs and performance metrics derived from analytics.
13. Apply data governance and regulatory compliance in energy data environments.

Target Audiences

1. Petroleum Engineers
2. Data Scientists in Oil & Gas
3. Production and Operations Managers
4. Drilling Engineers
5. Reservoir Engineers
6. IT Professionals in Energy Sector
7. Health, Safety, and Environment (HSE) Managers
8. Business Analysts and Decision Makers in Oil & Gas

Course Duration: 10 days

Course Modules

Module 1: Introduction to Big Data in Oil & Gas

- Overview of Big Data ecosystems
- Importance in the oil & gas value chain
- Data types: structured vs unstructured
- Technologies enabling big data
- Industry 4.0 and digital oilfield
- **Case Study**: BP's Big Data Transformation

Module 2: Data Management & Integration

- ETL processes in oilfield data
- Master data management
- Data warehousing vs data lakes
- Integration across upstream, midstream, downstream
- Metadata and data cataloging
- **Case Study**: Shell's Enterprise Data Hub

Module 3: IoT and Sensor Analytics

- SCADA systems and smart sensors

- Real-time data collection
- Edge vs cloud data processing
- Integration of IoT with AI
- Challenges and solutions in IoT analytics
- **Case Study**: Chevron’s IoT-enabled Predictive Maintenance

Module 4: Machine Learning and AI Applications

- Overview of ML algorithms
- Supervised vs unsupervised learning
- AI for drilling optimization
- Deep learning for seismic analysis
- Anomaly detection in equipment
- **Case Study**: Halliburton’s ML for Drilling Efficiency

Module 5: Predictive Maintenance in Oilfield Equipment

- Introduction to predictive models
- Vibration and thermal analytics
- Time-series forecasting
- Asset health monitoring tools
- ROI and business impact
- **Case Study**: GE Oil & Gas Predictive Maintenance Platform

Module 6: Seismic Data Analytics

- Data formats and storage
- Processing techniques (FFT, migration)
- Visualization tools
- Interpretation using ML
- Reservoir modeling with data analytics
- **Case Study**: Schlumberger Seismic AI

Module 7: Drilling and Production Analytics

- KPI tracking
- Real-time drilling parameters
- Automated mud logging
- Bit performance optimization
- Wellbore trajectory modeling
- **Case Study**: ExxonMobil’s Real-time Drilling Analytics

Module 8: Reservoir Management and Simulation

- Reservoir modeling fundamentals
- Static and dynamic modeling
- ML-enhanced simulation tools
- History matching using analytics
- Production forecast techniques
- **Case Study**: Saudi Aramco Integrated Reservoir Analytics

Module 9: Downstream Analytics and Refining

- Crude oil blending optimization
- Refinery yield prediction
- Asset utilization analysis

- Logistics and distribution data
- Retail fuel pricing analytics
- **Case Study**: Total's Refining Optimization with Big Data

Module 10: Energy Market Forecasting

- Energy pricing data analysis
- Demand prediction models
- Supply chain disruptions
- AI in trading and risk
- Renewable vs fossil fuel modeling
- **Case Study**: EIA Data Utilization for Market Forecasting

Module 11: Cloud Computing in Oil & Gas

- Introduction to AWS, Azure, GCP
- Cloud-native tools for data analytics
- Serverless data pipelines
- Hybrid architecture models
- Cost optimization strategies
- **Case Study**: Anadarko's Migration to AWS Cloud

Module 12: Cybersecurity in Oilfield Analytics

- Cyber threat landscape
- Securing SCADA and IoT data
- Role of encryption and firewalls
- Threat detection with ML
- Regulatory frameworks
- **Case Study**: Cyber Resilience at ENI

Module 13: Geospatial and Remote Sensing Analytics

- GIS fundamentals
- Satellite data for exploration
- Drone data processing
- Route optimization with geo-data
- ML for mapping and terrain modeling
- **Case Study**: Petrofac's Use of Remote Sensing for Pipeline Planning

Module 14: Data Visualization and Storytelling

- Importance of visualization in analytics
- Using Power BI and Tableau
- Real-time dashboards
- KPI and scorecard development
- Effective storytelling techniques
- **Case Study**: Apache's Executive Dashboards

Module 15: Data Governance and Ethics

- Regulatory requirements (GDPR, CCPA)
- Oil & gas data ownership
- Data ethics and bias in AI
- Consent and usage policies
- Building governance frameworks

- **Case Study**: ConocoPhillips Data Governance Strategy

Training Methodology

- Interactive lectures and industry-led sessions
- Hands-on labs using real datasets and tools
- Group discussions and peer collaboration
- Case study analysis and simulations
- Assessments through quizzes and project presentations

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
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

Start Date	End Date	Location	Price
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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