Training Course on Advanced Drilling Engineering and Wellbore Optimization

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 the fast-paced world of energy exploration and extraction, mastering Advanced Drilling Engineering and Wellbore Optimization is crucial for enhancing well performance, improving drilling efficiency, and minimizing operational risks. Training Course on Advanced Drilling Engineering & Wellbore Optimization designed for drilling professionals, engineers, and project managers aiming to develop expertise in advanced drilling mechanics, real-time drilling optimization, wellbore stability, and cost-effective well construction. With the advent of digital oilfields and data-driven operations, understanding advanced principles and applying optimization strategies has become a competitive necessity.

By incorporating industry case studies, simulation exercises, and real-world drilling challenges, this training provides a comprehensive and practical learning experience. Participants will gain insights into directional drilling, drilling hydraulics, bit technology, formation evaluation, and automated drilling analytics. The course is tailored to equip professionals with cutting-edge knowledge, empowering them to make informed decisions that drive safe, efficient, and productive drilling operations.

Programme Curriculum

Training Course on Advanced Drilling Engineering & Wellbore Optimization

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Course Objectives

1. Understand advanced drilling engineering principles for deepwater and complex wells.
2. Apply real-time drilling optimization techniques using digital tools and data analytics.
3. Evaluate and mitigate wellbore instability and formation damage.
4. Enhance drilling fluid performance for diverse geological formations.
5. Analyze torque and drag models for horizontal and extended reach wells.
6. Implement directional and horizontal drilling best practices.
7. Integrate automation and AI in drilling operations for higher efficiency.
8. Optimize drilling hydraulics and pressure management systems.
9. Minimize non-productive time (NPT) through predictive modeling.
10. Strengthen bit selection and drilling parameters for cost-effective drilling.
11. Use advanced casing design and cementing strategies.
12. Incorporate ESG-compliant drilling techniques for sustainable operations.
13. Leverage cloud-based drilling simulators and collaborative tools.

Target Audiences

1. Drilling Engineers
2. Petroleum Engineers
3. Wellsite Supervisors
4. Drilling Contractors
5. Operations Managers
6. Project Engineers
7. Oil & Gas Consultants
8. Technical Advisors in E&P Companies

Course Duration: 10 days

Course Modules

Module 1: Fundamentals of Advanced Drilling Engineering

- Overview of modern drilling practices
- Key components of drilling systems
- Importance of drilling mechanics
- Drilling challenges in deep and HPHT wells
- Drilling economics and cost control
- **Case Study: Engineering Design for a High-Pressure Horizontal Well**

Module 2: Drilling Fluids Engineering

- Fluid types and properties
- Rheology and hydraulics analysis
- Drilling fluid additives and functions
- Environmental impact and compliance
- Mud logging and solids control
- **Case Study: Mud Loss Prevention in Fractured Formations**

Module 3: Wellbore Stability & Stress Analysis

- Causes of borehole instability
- Rock mechanics fundamentals
- In-situ stress and pore pressure modeling
- Fracture gradient prediction
- Stability design in complex formations
- **Case Study: Preventing Collapse in Shale Formation Wells**

Module 4: Torque & Drag Optimization

- Principles of drag forces and torque
- Lubrication and friction factors
- BHA design for minimal resistance
- Monitoring and prediction techniques
- Software tools for torque and drag analysis
- **Case Study: Reducing Mechanical Drag in Long-Reach Wells**

Module 5: Directional and Horizontal Drilling

- Directional well planning
- Surveying and trajectory control
- Bottom Hole Assembly (BHA) design
- Horizontal drilling tools and techniques
- Anti-collision and risk control
- **Case Study: Precision Drilling in a Multi-Lateral Well**

Module 6: Drilling Hydraulics

- Pressure loss calculation
- Nozzle optimization
- Cuttings transport in deviated wells
- Annular velocity and ECD control
- Software simulation for hydraulics
- **Case Study: ECD Management in Narrow Window Drilling**

Module 7: Drilling Bit Technology

- Bit types and classifications
- Rock-bit interaction and wear analysis
- Selection criteria for formations
- Bit optimization strategies
- Performance evaluation techniques
- **Case Study: Bit Failure Analysis in Volcanic Formations**

Module 8: Real-Time Drilling Optimization

- Sensors and data acquisition
- Digital twins and predictive analytics
- Downhole telemetry systems
- Surface parameter interpretation
- Data integration and visualization tools
- **Case Study: Real-Time Optimization During Offshore Drilling**

Module 9: Managed Pressure Drilling (MPD)

- MPD principles and classifications

- Control systems and automated chokes
- Applications in narrow margin wells
- MPD vs. conventional drilling
- Risk management and crew training
- **Case Study: MPD in a Deepwater Subsalt Well**

Module 10: Well Control and Blowout Prevention

- Kick detection and response
- Barrier management
- Shut-in procedures
- BOP types and configurations
- Kill methods and equipment
- **Case Study: Blowout Containment During HPHT Operation**

Module 11: Extended Reach Drilling (ERD)

- ERD planning and design
- Limiting factors and mitigation
- Casing and cementing in ERD wells
- Real-time monitoring and downhole tools
- Drillstring integrity in long wells
- **Case Study: Longest Onshore Reach Well in Middle East**

Module 12: Casing Design and Cementing

- Load conditions and burst/collapse analysis
- Casing materials and properties
- Cement slurry design
- Cement placement techniques
- Zonal isolation and integrity testing
- **Case Study: Cement Bond Log Interpretation in Unstable Zone**

Module 13: Drilling Risk Management

- Risk identification and categorization
- Quantitative risk analysis methods
- Contingency planning and mitigation
- Safety protocols and compliance
- Failure mode and effect analysis (FMEA)
- **Case Study: NPT Reduction in Remote Arctic Operations**

Module 14: AI and Automation in Drilling

- Applications of machine learning in drilling
- Automated rig systems
- Predictive maintenance
- Drilling robotics and control
- Future trends in intelligent drilling
- **Case Study: AI-Driven Performance Gains in Offshore Rigs**

Module 15: ESG & Sustainability in Drilling Operations

- Environmental compliance and reporting
- Low-impact drilling fluids
- Waste management and emissions reduction

- Social responsibility in E&P
- Carbon footprint tracking technologies
- **Case Study: Sustainable Drilling in Ecologically Sensitive Area**

Training Methodology

- Interactive lectures and multimedia presentations
- Hands-on simulations and software workshops
- Group discussions and expert panels
- Problem-solving based on actual drilling scenarios
- Pre- and post-training assessments
- Detailed case study reviews for each module

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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