Digital Oilfield and Intelligent Well Systems Training Course

23 - 27 Nov 2026

Cape town

4600 € (Per Person)

Ref: #OG6648_274763

Course Introduction / Overview:

The global energy sector is undergoing a profound transformation, driven by the imperative to maximize recovery, enhance operational efficiency, and improve safety standards. This shift towards digitalization, often termed the Fourth Industrial Revolution in the oil and gas industry, is at the core of modern exploration and production strategies. The Digital Oilfield and Intelligent Well Systems Training Course offered by BIG BEN Training Center provides a comprehensive, A-to-Z exploration of this critical domain. This program is meticulously designed to bridge the gap between traditional petroleum engineering and cutting-edge digital technologies. Participants will delve into the foundational principles of the digital oilfield, exploring how real-time data, advanced analytics, and automation are revolutionizing reservoir management and production optimization. We will examine the pioneering work of academics like Bernt S. Aadnoy, whose contributions in publications such as "Advanced Well Completion Engineering" have laid the groundwork for many modern intelligent completion technologies. This course moves beyond theoretical concepts, focusing on the practical integration of downhole sensors, smart well completions, and data-driven decision-making frameworks to create a fully integrated, intelligent operational environment, ensuring participants are equipped to lead the digital evolution in their organizations.

Target Audience / This training course is suitable for:

- Petroleum Engineers.
- Reservoir Engineers.
- Production and Operations Engineers.
- Completion and Well Intervention Engineers.
- Drilling Engineers.
- Geoscientists and Petrophysicists.
- Data Scientists and Analysts in the energy sector.
- IT Professionals supporting upstream operations.
- Asset Managers and Team Leads.
- Field Technicians and Supervisors.

Target Sectors and Industries:

- Oil and Gas Exploration and Production (E&P) Companies.
- Oilfield Service and Equipment Manufacturing Companies.
- Engineering, Procurement, and Construction (EPC) Contractors.
- Technology and Software Providers for the Energy Industry.
- Governmental bodies and national oil companies (NOCs).
- Energy Sector Consulting and Advisory Firms.
- Research and Development Institutions.

Target Organizations Departments:

- Upstream Operations and Production.
- Drilling and Completions.
- Reservoir Engineering and Management.
- Subsurface and Geoscience Teams.
- Digital Transformation and Information Technology (IT).
- Asset Integrity and Management.
- Health, Safety, and Environment (HSE).
- Strategic Planning and Development.

Course Offerings:

By the end of this course, the participants will have able to:

- Analyze the complete architecture and key components of a modern digital oilfield.
- Evaluate various intelligent well completion technologies and their applications.
- Design monitoring strategies using downhole sensors and fiber optic systems.
- Implement real-time data acquisition and control systems for production optimization.
- Apply data analytics and machine learning concepts to solve operational challenges.
- Develop frameworks for integrating digital technologies into existing oilfield workflows.
- Assess cybersecurity risks associated with interconnected operational technology (OT).
- Formulate a business case for digital oilfield implementation projects.
- Understand the role of digital twins in asset lifecycle management.
- Lead digital transformation initiatives within their respective departments.

Course Methodology:

The training methodology at BIG BEN Training Center is designed to be immersive, interactive, and highly practical, ensuring that participants can directly apply their learning to real-world scenarios. This course moves beyond traditional lectures by incorporating a blended learning approach that combines expert-led instruction with dynamic, hands-on activities. A significant portion of the training will be dedicated to analyzing real-world case studies from major oilfields, allowing participants to dissect successful digital transformation projects and learn from industry challenges. Collaborative group workshops will encourage participants to brainstorm solutions for complex operational problems, fostering teamwork and knowledge sharing. Interactive sessions, facilitated discussions, and Q&A segments will ensure a deep understanding of complex topics like data integration and workflow automation. Participants will engage with simulated scenarios that challenge them to make critical decisions based on real-time data, mirroring the pressures of a modern control room. Continuous feedback from our expert instructors will guide participants throughout the course, solidifying their understanding and building confidence in their new skills. This comprehensive approach ensures a rich and impactful learning experience.

Course Agenda (Course Units):

Unit One: Fundamentals of the Digital Oilfield

- Introduction to the digital oilfield concept and its evolution.
- Key components and architecture of an integrated digital ecosystem.
- The business value and ROI of digitalization in upstream E&P.
- Data acquisition, transmission, and management fundamentals.
- The role of SCADA and distributed control systems (DCS).
- Understanding the convergence of IT and Operational Technology (OT).
- Challenges in data integration and legacy system modernization.

Unit Two: Intelligent Well Systems and Completion Technologies

- Principles of intelligent and smart well completions.
- Inflow Control Valves (ICVs) and Inflow Control Devices (ICDs).
- Permanent Downhole Gauges (PDHG) for pressure and temperature monitoring.
- Advanced downhole flow control and zonal isolation techniques.
- Fiber Optic Sensing: Distributed Temperature Sensing (DTS).
- Fiber Optic Sensing: Distributed Acoustic Sensing (DAS).
- Design considerations for intelligent well completions in various reservoirs.

Unit Three: Real-Time Monitoring and Production Optimization

- Integrated production operations and real-time surveillance.
- Workflow automation for production engineering tasks.
- Artificial lift optimization using real-time data.
- Real-time reservoir management and model updating.
- Choke modeling and multiphase flow metering.
- Predictive analytics for equipment failure and downtime prevention.
- Case studies in real-time production optimization.

Unit Four: Advanced Data Analytics and Machine Learning in E&P

- Introduction to Big Data, AI, and Machine Learning for the oilfield.
- Applications of machine learning in reservoir characterization.
- Predictive maintenance for critical equipment like ESPs and pumps.
- The concept and application of Digital Twins for wells and facilities.
- Using data analytics for drilling and completion performance improvement.
- Anomaly detection in production data streams.
- Building a data-driven culture within an E&P organization.

Unit Five: Integration, Cybersecurity, and Future of Intelligent Operations

- Strategies for integrating disparate data sources and systems.
- Cybersecurity threats and vulnerabilities in the digital oilfield.
- Best practices for securing industrial control systems (ICS).
- The role of cloud computing and edge computing in E&P.
- The emergence of the autonomous oilfield and remote operations.
- Change management for successful digital transformation.
- Course review, final project presentations, and forward-looking discussion.

FAQ:

Qualifications required for registering to this course?

There are no requirements.

How long is each daily session, and what is the total number of training hours for the course?

This training course spans five days, with daily sessions ranging between 4 to 5 hours, including breaks and interactive activities, bringing the total duration to 20 - 25 training hours.

Something to think about:

As autonomous systems become more prevalent in oilfield operations, what are the primary ethical and operational risks that must be managed beyond purely technical cybersecurity threats?

What unique qualities does this course offer compared to other courses?

This course distinguishes itself by offering a holistic, strategic perspective on the digital oilfield, moving beyond a purely technical or software-specific focus. While other programs may concentrate on individual technologies, our curriculum, developed by experts at BIG BEN Training Center, emphasizes the critical integration of engineering, data science, and operational management. We bridge the gap between the subsurface knowledge of a petroleum engineer and the analytical capabilities of a data scientist, creating a unified understanding essential for modern E&P success. The course content is heavily rooted in practical application, utilizing an extensive library of real-world case studies that illustrate both the triumphs and pitfalls of digital implementation in diverse geological and operational settings. Rather than simply teaching what a digital twin is, we explore how to build a business case for it, manage its lifecycle, and integrate its insights into daily workflows. The focus is on developing strategic thinkers who can not only understand the technology but can also lead the complex change management processes required to build a truly intelligent and efficient oilfield operation.

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