



N694: Basic Drilling Technology

Instructor(s): Kevin Gray

Format and Duration

Classroom - 5 Days

Summary

This course provides a comprehensive introduction to drilling technology and well construction, covering the practices, equipment, and safety measures used throughout the drilling process. Participants will be taken through the step by step process of drilling a well, learning what happens at each stage and who is involved. The course is designed to progress logically, introducing basic concepts in simple terms and gradually building towards a full understanding of drilling operations. The course also emphasizes how wells are designed, constructed, and maintained safely, including well control techniques, casing and cementing operations, and environmental protection measures. By the end of the course, participants will have a solid foundation in drilling technology, allowing them to communicate effectively with drilling professionals, understand the basic engineering and technical aspects of drilling, and recognize how drilling fits into the wider oil and gas industry.

This course is designed for individuals new to the industry or those seeking a fundamental understanding of drilling operations and technology. No prior knowledge required as the course builds understanding step by step, covering the processes, people, and technology involved in drilling a well from start to finish.

This course is delivered in partnership with Black Reiver Consulting Ltd.

Learning Outcomes

Participants will learn how to:

1. Understand the overall process of drilling a well and how different teams contribute.
2. Communicate effectively with drilling professionals, understanding industry terminology and acronyms.
3. Recognize the key components of a drilling rig, how they work, and why they are essential.
4. Understand well design principles, casing, cementing, and how wells are made safe.
5. Identify common drilling problems and how they are prevented or mitigated.
6. Understand the basics of directional drilling and how wells are steered underground.
7. Recognize the importance of well integrity, safety, and environmental protection in drilling.

Training Method

This is a classroom course comprising a mixture of lectures, discussion, case studies, and practical exercises.

- Hands on classroom demonstrations using models and simulations.
- Instructor led interactive sessions combining PowerPoint, whiteboard discussions, and real world examples.
- Step by step explanations that progressively build knowledge across drilling topics.
- Extensive Q&A opportunities, allowing participants to explore specific areas of interest.
- Optional Half-Day Rig Visit at selected locations, providing real-world exposure to drilling



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operations.

Who Should Attend

This course is ideal for:

- Newcomers to the drilling industry or those considering a career in oil & gas.
- Geoscientists & Reservoir Engineers seeking a better understanding of drilling operations.
- Finance, logistics, and supply chain professionals working in the drilling industry.
- Suppliers & service providers supporting drilling operations.
- Sales professionals working with drilling technology and services.
- Individuals at any academic level with an interest in drilling technology.

Course Content

1. Introduction to Drilling Operations & the Drilling Team

- What is Drilling? – The role of drilling in oil and gas exploration and production.
- The Drilling Team – Who Does What?
- The roles of drilling engineers, rig crews, geologists, and service companies.
- The planning and mobilization process before drilling begins.

2. Drilling Rigs & Equipment

- Types of drilling rigs – Onshore, offshore, and specialized drilling systems.
- Rotary drilling rig components – Power systems, hoisting systems, and instrumentation.
- Automation & digital drilling technologies.

3. Drilling Safety & Environmental Considerations

- Preventing blowouts, spills, and other drilling hazards.

4. How a Well is Designed & Planned

- The step by step well design process.
- Understanding geological factors that affect well planning.

5. Drilling the Wellbore – How Wells constructed

- Drilling, circulating and tripping operations

6. The casing and cementing process.

- Why casing and cementing are critical for well integrity.



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- Cementing Equipment & Techniques
- How cement is placed to protect wellbore stability and prevent fluid migration.

7. Drilling Fluids ("Muds") & Their Functions

- What drilling fluids do – cooling, lubrication, cuttings transport, and well pressure control.
- Choosing the right mud properties for different drilling conditions.

8. Drill Bits & Cutting Mechanics

- Types of drill bits and how they match the geology of the well.
- The impact of bit selection on drilling efficiency and cost.

9. Well Control & Blowout Prevention

- How drilling teams prevent uncontrolled fluid flow (kicks and blowouts).
- The role of the Blowout Preventer (BOP) in well safety.

10. Introduction to Directional Drilling

- How wells can be steered underground to reach different reservoir targets.
- Extended Reach, High Angle, and Multilateral Drilling techniques.
- Measurement While Drilling (MWD) & Formation Evaluation
- How MWD tools help drillers navigate and position the well.
- Formation evaluation while drilling (LWD) – understanding the rocks in real time.
- Drill String Components & BHA Design
- Drill pipes, collars, stabilizers, and steering tools.

11. What Can Go Wrong While Drilling?

- Well collapse, stuck pipe, drill string failures, and equipment limitations.
- How drilling engineers prevent and troubleshoot problems.

12. Well Completion – Preparing the Well for Production

- How we control reservoir fluids while drilling but release them for production.
- The equipment used to complete a well, including tubing, packers, and perforations.

This course provides a structured introduction to drilling technology, covering the processes, equipment, and challenges involved in drilling a well. By the end of the course, attendees will have a strong foundation in drilling principles, industry terminology, and operational workflows, allowing them to confidently engage with drilling professionals and understand key drilling operations.

*Optional Rig Visit: In select locations, participants will have the opportunity for a half day drilling rig visit



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to observe real world drilling operations.