

# Directional Drilling & Surveying



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## Introduction:

The goal of the course is to enable participants to understand the operations carried out by directional drillers and contribute to the design of directional and horizontal wells. The course covers the fundamentals, design considerations and operational aspects of directional and horizontal drilling. It provides a detailed overview of all of the elements of the directional drilling process to ensure an understanding of how measurements are applied and directional controls are implemented.

This course covers the fundamentals of directional drilling and surveying designed to give MWD engineers a more complete understanding of the practices employed during the application of the complimentary disciplines. The course covers every stage of the directional drilling process from initial well planning and location selection through to final landing of the well. The principles that underlie the most common directional drilling and surveying applications are covered in detail, ensuring a solid theoretical understanding of how current techniques are applied. This module is intended for those already familiar with general drilling practices, and assumes some pre-existing knowledge of rig site operations and the general progress of the well during the well construction phase.

## Objectives:

By the end of this course delegates will be able to:

- Learn about directional drilling fundamentals
  - Know about the application of directional drilling
  - Gain the required terminology
  - Know about directional well planning operations
  - Know about well surveying operations
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- Learn about straight-hole surveying and instruments
  - Know directional surveying and instruments
  - Identify down hole equipment
  - Identify directional drilling problems and solutions

## Who should attend?

Drilling Engineers, Senior Drilling Engineers, Drilling Supervisors, Work over Engineers, Petroleum Engineers, Completion Engineers, Tool Pushers, Reservoir and Senior Reservoir Engineers, Geologists, Production Engineers, Well site Engineers, Foremen, and Industry Personnel.

## Course Outline:

- Directional drilling fundamentals
  - Applications and limitations of directional drilling
  - Algebra and trigonometry review
  - Terminology of directional drilling
  - Well objectives and target issues
  - Directional well planning
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- Positioning and coordinate systems
  - Well surveying
  - Straight-hole surveying and instruments
  - Directional surveying and instruments
  - Photographic, down hole telemetry and MWDs
  - Survey calculation methods
  - Anti-collision and advanced well planning
  - Surveying tools
  - MWD and LWD
  - Down hole equipment
  - Drilling tools and deflection methods
  - Drilling motors and bit overview
  - BHA design
  - Rotary Steerable Systems
  - Directional well path design
  - Horizontal well planning

- Well profile
- Well path - trajectory design
- Hydraulics Calculations
- Hole cleaning
- Introduction to multilateral
- Wellbore stability
- Geosteering
- Directional drilling problems and solutions