Basic Drilling Technology

Course Price

£2750

Course Description

Course Objectives

The aim of this short course training is to provide a basic knowledge of the theoretical and practical aspects of drilling operations.

At the end of this course participants will be able to:

- Understand hydrocarbon formation
- Describe key characteristics of hydrocarbon reservoir (rock, source, tap, seal)
- Have idea about upstream and downstream petroleum industry
- Identify different rig types
- Learn different components of drilling rig and understand their basic functions
- Have basic understanding of downhole wellbore pressures and the means to control them
- Learn the principles of drilling, cementing, casing processes
- Learn the principles of well control and blowout prevention
- Understand basic functions of drilling fluids and cement
- List differences between onshore and offshore drilling processes
- Describe the basic principles of logging and MWD/LWD
- Describe the methods of drilling deviated and horizontal wells
- Have an understanding of the components and functions of well completion (valves, artificial lift, sand control)
Who Should Attend

This short course is intended for all those involved in drilling and requiring basic knowledge of drilling engineering.

Course Content

• Well planning overview
• History and source of petroleum
• Multi-level interdependency of the Petroleum Industry
• Drilling rig systems, their purpose and use
• Principles of the drilling process, fishing, casing and cementing
• Knowledge and ability in the principles of directional drilling
• Knowledge and ability in the principles of well control and blowout prevention
• Differences between onshore and offshore drilling rigs and drilling practices
• How established drilling practices interface with modern tools and technology
• The causes and prevention practices concerning lost circulation, stuck pipe

Day 1

1. Introduction, Terminology, Drilling Context

• Introductions
• A bit of oil history – Terminology of Petroleum & of Drilling
• Drilling planning overview
• Oil prices & drilling
• Major drilling accomplishments & challenges
QUIZ: pre – assessment of knowledge level on BDT

2. Essentials of Geology
   • Hydrocarbon formation
   • Key elements of economic reservoir, rocks, traps, seals
   • Geological and geophysical information

VIDEO-1: Origins of Petroleum

3. Drilling Rigs & Drilling Systems
   • Onshore – Offshore rigs characteristics
   • Drilling challenges
   • Rig components – Well classification
   • Power – Hoisting system
   • Circulation system / pumps
   • Control system / BOPs
   • Monitoring system

VIDEO-2: Drilling Rigs

4. Drilling Costs
   • Drilling cost estimation – Types of costs
   • Acquisition For Expenditure (AFE)

QUIZ – Test your knowledge on today’s lectures
Day 2

1. Drilling Fluids & Drilling hydraulics
   • Drilling fluid types – Uses
   • Fluid properties – additives
   • Rheology of drilling fluids
   • Static / dynamic conditions / circulation
   • Rheological models, pressure losses
   • Bit hydraulics
   • Cuttings transport issues

EXERCISE: Determine drilling fluid density

CASE STUDY: Basics of drilling fluid design

2. Abnormal Pressures, Kicks & Kick Control
   • Sedimentary rocks – Overpressure generation
   • Pore pressure / Fracture pressure estimation
   • Kick definition / Kick sequence
   • Control methods, BOPs (video)
   • Kick detection

VIDEO-3: Kicks & kick control

EXERCISE: Kick control example

3. Casing Design
• Purpose of casing design

• Casing / hole diameter selection

• Burst / Collapse pressure calculations

• Casing depth estimation

• Mud weight estimation

4. Cementing & Cement Job Design

• Cementing process

• Cements & types of cements, additives

• Cement placement / Cementing problems

• Cement job evaluation

EXERCISE: Cement slurry density & yield calculation

Day 3

1. The drill string

• Drill string components

• Drilling bits

• Bit wear / Bit selection

• Drill collars, characteristics & selection

• Drill pipe characteristics

• Bottom Hole Assembly

2. Directional & Horizontal Drilling

• Purpose, history & types of deviated wells
- Inclination & azimuth
- MWD
- Horizontal / ERD wells
- Multilaterals
- Coil-Tubing-Drilling

VIDEO-4: Directional Drilling

3. Well Logging & Completions
- Logging
- Mud Log
- Open hole logs
- RFT, Drill stem testing
- Basic components & function of completions
- Stimulation

4. Drilling Problems & Advanced Techniques
- Types of drilling problems, severity
- Lost circulation – Stuck pipe – Junk in hole
- Surface / downhole measurements / problem prevention
- Managed Pressure Drilling / Casing Drilling / Dual Gradient Drilling

VIDEO-5: Managed Pressure Drilling
FINAL QUIZ : post-assessment of knowledge level on BDT

CPD Unit
Continuing Professional Development

21 HOURS CPD