

## Stage 2: Basic Short Course — Drilling Technology (2Days)

### About the course:

The course focuses on the concept of effective well construction, and aims to develop high levels of professional skill in the key areas of well design, drilling and operations management.



### Who should attend?

Typical students include those working in oil and gas companies, energy companies, national oil companies, engineering firms and project service companies. Graduates of MSc Drilling and Well Engineering are now employed in every oil producing area of the world and work for many of the oil majors and drilling contractors.

### Aims of Module:

This module focuses on the Engineering practices of Well Construction. To be able to adapt these practices to a range of well types, and encouraging a strategic approach to well planning.

### Indicative Module Content:

#### 1. Stress Analysis / Torque & Drag

Bi-axial and tri-axial stress analysis  
Piston, buckling, ballooning,  
temperature, compression & tension equations

#### 2. Directional Drilling

Positioning and Co-ordinate Systems  
Survey calculation methods  
Basic well planning  
Anticollision and advanced well planning  
Drilling tools  
BHA design

#### 3. Casing and Tubing Design

Mechanical Properties of Steel  
Yield Strengths  
Buoyancy effects  
Shoe depth determination  
Design Criteria  
Burst and collapse loads  
Connections and material grades  
Wellheads

#### 4. Cementing Operations

Composition  
Testing  
Slurry Properties  
Placement techniques

#### 5. Bit Technology

Bit Hydraulics  
Bit Types  
Bit Selection

#### 6. Surveying

Magnetic tools: theory and considerations  
Non-Magnetic tools: theory and considerations  
Measurements while Drilling  
Survey programming

#### 7. Drillstring design

Tool-joints and handling  
Operating limits  
Drillstring corrosion  
Inspection and classification

#### 8. Well design process

### Why attend?

On completion of this module, students are expected to be able to:

1. Create a well design premise to include: Well integrity, casing program, completion and production requirements.
2. Design a directional well, select appropriate kick-off points, build rates, required hole angles and bottom hole assemblies.
3. Develop a casing and cement program with regard to production flow rates and basic design principles. Determine protective casing setting depths required to protect fresh water sands, referencing pore pressure and frac plots and regulatory requirements (e.g. fresh water protection, zonal isolation etc.).
4. Explain and justify the functional and loading requirements of various tubular strings, in order to make a complete design selection for a wide range of different well conditions.
5. Appraise and discuss the principles and theory of survey programming; geodetics, positional uncertainty, tools, calculations, by creating a valid survey program, to meet given design objectives.