

## MODULE DESCRIPTOR

### Module Title

Oil and Gas Engineering A

Reference	EN4580	Version	6
Created	March 2023	SCQF Level	SCQF 10
Approved	March 2004	SCQF Points	15
Amended	August 2023	ECTS Points	7.5

### Aims of Module

To provide the student with the basic knowledge of the requirements for safe oil and gas well drilling.

### Learning Outcomes for Module

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

- 1 Execute the design of an oil and gas well, taking into consideration aspects of casing setting depth, casing selection, cementing, and well inclination requirements.
- 2 Examine the hazards involved in oil and gas well drilling including equipment, materials, and processes for safe drilling.
- 3 Appraise drilling fluids and hydraulics for safe oil and gas well drilling, taking into consideration the aspects of HSE, costs and formation characteristics.

### Indicative Module Content

1. The Drilling Process: Basic Stress/Strain theory, Definition of Principal stresses; Theories of rock fracture and factors relating to penetration rate and direction control; Bit types and selection. 2. Drilling Equipment: Rotary drilling techniques for Vertical and Directional wells; derrick design. 3. Basic Principles of Well Planning & Construction: Definition of hole sizes versus casing sizes/setting depths; Directional Planning; Casing and Cementing programme Design. 4. Drilling Fluids, Functions and Types: Drilling Fluids Classification: Newtonian and Non-Newtonian - Power law, Herschel Bulkley and Bingham Plastic fluids; Fluid Mechanics of drilling fluids: Flow of Slurries and pressure drop calculations for flow in pipes and annulus. 5. Drilling Hydraulics: Measurement of drilling fluids properties: Introduction to basic instruments - Mud balance, Viscometers, Filtration cells, Retort kit, etc 6. Drilling Hazards. Causes, Prevention and Control measures for: Formation Damage; Sloughing Shales; Washouts; Mud Contamination; Lost Circulation; Stuck pipe; pressure Surge and Swabbing; Kick and Blowout.

### Module Delivery

This is a lecture-based module supplemented by tutorials and case studies.

<b>Indicative Student Workload</b>	Full Time	Part Time
Contact Hours	35	35
Non-Contact Hours	115	115
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
<b>TOTAL</b>	<b>150</b>	<b>150</b>
<i>Actual Placement hours for professional, statutory or regulatory body</i>		

## ASSESSMENT PLAN

If a major/minor model is used and box is ticked, % weightings below are indicative only.

### Component 1

Type: Examination Weighting: 100% Outcomes Assessed: 1, 2, 3  
 Description: Closed book examination

## MODULE PERFORMANCE DESCRIPTOR

### Explanatory Text

Component 1 comprises 100% of the module grade. To pass the module, a D grade is required.

Module Grade	Minimum Requirements to achieve Module Grade:
<b>A</b>	A
<b>B</b>	B
<b>C</b>	C
<b>D</b>	D
<b>E</b>	E
<b>F</b>	F
<b>NS</b>	Non-submission of work by published deadline or non-attendance for examination

## Module Requirements

Prerequisites for Module Offshore Engineering (EN3581).  
 Corequisites for module None.  
 Precluded Modules None.

## INDICATIVE BIBLIOGRAPHY

- 1 RABIA, H., 1985. Oilwell Drilling Engineering-Principles and Practice. London:Graham & Trotman.
- 2 GATLIN, C., 1960. Petroleum Engineering - Drilling and Well Completions. Eaglewood Cliffs, NJ: Prentice Hall).
- 3 CHILINGAR, G.V., 1983. Drilling and Drilling Fluids. Amsterdam : Elsevier.
- 4 JOSHI, S.D., 1991. Horizontal Well Technology. Tulsa, Okla : Penwell Books.
- 5 BOURGOYNE (Jr) A. T., CHENEVERT, M. E., MILLHELM, K. K. & YOUNG, F. S., 1986. Applied Drilling Engineering. SPE Textbook Series, Vol 2
- 6 BYARS, H. G., 1999. Corrosion Control in Petroleum Production, TPC Publication 5; (2nd Edition); NACE Inter; Houston