

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.

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

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:
A	A
B	B
C	C
D	D
E	E
F	F
NS	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