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MODULE DESCRIPTOR

Module Title

Oil and Gas Engineering A

Reference	EN4580	Version	5
Created	August 2021	SCQF Level	SCQF 10
Approved	March 2004	SCQF Points	15
Amended	August 2021	ECTS Points	7.5

Aims of Module

To provide the student with the ability to evaluate the theory and practice of drilling engineering; with particular reference to the oil/gas industry.

Learning Outcomes for Module

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

1	Explain materials corrosion mechanisms and control techniques.
2	Appraise the equipment and processes involved in drilling a well.
3	Explain drilling fluids technology including type, properties and flow behaviour.
4	Asses the hazards involved in drilling and the preventive measures.

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. Properties of materials and failure mechanisms including corrosion mechanism and control. 5. 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. 6. Drilling Hydraulics: Measurement of drilling fluids properties: Introduction to basic instruments - Mud balance, Viscometers, Filtration cells, Retort kit, etc 7. 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 or coursework.

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Indicative Student Workload	Full Time	Part Time
Contact Hours	60	60
Non-Contact Hours	90	90
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:	Coursework	Weighting:	30%	Outcomes Assessed:	1
Description:	Coursework.				

Component 2

Type:	Examination	Weighting:	70%	Outcomes Assessed:	2, 3, 4
Description:	Closed book examination.				

MODULE PERFORMANCE DESCRIPTOR

Explanatory Text

The module has 2 components and to gain an overall pass a minimum D grade must be achieved in each component. The component weighting is as follows: C1 is worth 30% and C2 is worth 70%.

		Coursework:						
		A	**B**	**C**	**D**	**E**	**F**	**NS**
Examination:	**A**	A	A	B	B	E	E	
	B	B	B	B	C	E	E	
	C	B	C	C	C	E	E	
	D	C	C	D	D	E	E	
	E	E	E	E	E	E	F	
	F	F	F	F	F	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.

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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