

## MODULE DESCRIPTOR

### Module Title

Oil And Gas Engineering A

Reference	EN4580	Version	4
Created	February 2017	SCQF Level	SCQF 10
Approved	March 2004	SCQF Points	15
Amended	June 2017	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.

<b>Indicative Student Workload</b>	Full Time	Part Time
Contact Hours	60	60
Non-Contact Hours	90	90
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: Coursework Weighting: 30% Outcomes Assessed: 1  
 Description: This is a single case-study based coursework

### Component 2

Type: Examination Weighting: 70% Outcomes Assessed: 2, 3, 4  
 Description: This is a closed book examination

## MODULE PERFORMANCE DESCRIPTOR

### Explanatory Text

In order to pass, students should achieve a mark of at least 35% in each component (which has a weighting of 30% or more) and an overall grade D or better.

Module Grade	Minimum Requirements to achieve Module Grade:
<b>A</b>	Greater than or equal to 70%
<b>B</b>	In the range 60% to 69%
<b>C</b>	In the range 50% to 59%
<b>D</b>	In the range 40% to 49%
<b>E</b>	In the range 35% to 39%
<b>F</b>	In the range 0% to 34%
<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