

MODULE DESCRIPTOR

Module Title

Advanced Well Engineering

Reference	ENM212	Version	8
Created	May 2023	SCQF Level	SCQF 11
Approved	April 2006	SCQF Points	15
Amended	January 2024	ECTS Points	7.5

Aims of Module

This module focuses on the application of engineering practices to optimise well construction and well design.

Learning Outcomes for Module

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

- 1 Analyse 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.
- 2 Critically evaluate casing programme based on casing setting depths with reference to formation pressures.
- 3 Design cement and drilling fluid programme for specific well operations.
- 4 Critically evaluate drilling hydraulics optimisation.

Indicative Module Content

Drill string and drilling tools: drilling equipment, drill string design considerations, equipment functions, mechanical properties of steel yield strengths, buoyancy effects, shoe depth determination. Casing design Criteria: burst, collapse, tension and biaxial loads and material. Cementing: operations, facilities, composition, testing and slurry properties, placement techniques and volume calculations. Drilling fluids and completion fluids: types, main properties and testing equipment, selection criteria, mud and formation chemistry, inhibition, system formulation and handling, mud weight selection criteria, volume calculations, mud management, and environmental considerations. Drilling hydraulics and its optimisation: rheological characterisations, design for minimum annular velocity, hole cleaning and nozzle selections.

Module Delivery

The module will be delivered by means of face to face and blended learning including seminars, lectures, site visits (full-time) and part-time (online learning part-time) lectures, tutorials, student-centred learning activities, and self-guided study. Emphasis is placed on an integrative approach to communication, engagement and learning, with student involvement fostered through discussion and group work.

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
<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:	100%	Outcomes Assessed:	1, 2, 3, 4
Description:	Report.				

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	Normally a UK 2.2 honours degree or above, in Engineering or a related discipline. Proficiency in English language for academic purposes, or IELTS score of 6.5 or above. Qualification through previous relevant industry experience may be considered.
Corequisites for module	None.
Precluded Modules	This module is not suitable for students following an MSc in Professional Studies programme unless they meet the entry qualifications stipulated in the University Regulations on admission and the prerequisites above.

INDICATIVE BIBLIOGRAPHY

- 1 RABIA H. 1985. Oilwell Drilling Engineering. Graham & Trotman
- 2 ISLAM, M. RAFIQUL and HOSSAIN, M. ENAMUL. 2020. Drilling Engineering: Towards Achieving Total Sustainability. San Diego: Elsevier Science & Technology.
- 3 AADNOY, B.S. 2010. Modern Well Design. 2nd Edition. CRC Press
- 4 GEFEI, L. 2021. Applied Well Cementing Engineering. Gulf Professional Publishing.
- 5 BOURGOYNE et al. 1984. Applied Drilling Engineering. SPE Publications.
- 6 ROBINSON, H. and GARCIA, J. 2015. Drillers knowledge book: creative solutions for today's drilling challenges. Houston, Texas: International Association of Drilling Contractors.
- 7 Journal articles, conference proceedings, and appropriate websites. Example OnePetro, Knovel, ASME.