**This Version is No Longer Current**
The latest version of this module is available here

## MODULE DESCRIPTOR

### Module Title

Wells

| | | | |
|---|---|---|---|
| Reference | ENM201 | Version | 11 |
| Created | May 2022 | SCQF Level | SCQF 11 |
| Approved | May 2006 | SCQF Points | 15 |
| Amended | August 2022 | ECTS Points | 7.5 |

### Aims of Module

This module provides a broad understanding of the principles of well construction, specifically from the perspective of well integrity. It presents a systematic approach to the safe planning and the design of wells, including rig systems, drilling hazard evaluation and mitigations, well barriers and well control, casing and cementing, fluids, and well productivity/injectivity and managing corrosion. It provides an introduction to the basic methods, concepts, and technology required to develop a basis of design and operational plan for drilling and completions, covering producers and water/CO2 injectors, including an overview of industry net zero initiatives related to wells.

### Learning Outcomes for Module

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

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|---|---|
| 1 | Critically analyse and evaluate rig types, rig systems, and drilling components to be utilised for drilling a designated well, including the functions of the equipment. |
| 2 | Critically evaluate cement and drilling fluids functions and properties and perform calculations relating to drilling operations. |
| 3 | Critically appraise and explain the problems when drilling through different formations and identify the actions required to mitigate these. |
| 4 | Evaluate drill bit selection and analyse the drilling hydraulics for specific well operations. |
| 5 | Analyse and apply the concept of flow into the wellbore (Inflow Performance Relationship) and up the production tubing (Vertical Lift Performance) along with the function of the principal completion components from the reservoir interface to surface. |

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## Indicative Module Content

1.Introduction, History, People, Well Lifecycle. 2. Drilling Process & Design, Drilling platforms and their motion, Rig systems, and Rig Components. Drilling Process, Casing String, Functions, and methods of selection. 3. Well Control, Well Barriers, Functions, Types, Well Integrity, Oilfield Pressures. 4. Fluids (Muds & Cements), Drilling Fluids, Cements & Cementing. Cement Basics & Chemistry. 5. Drill string & Ancillaries, BHA & Tool string, Drilling Problems, Introduction to Rock Bits, Formation Pressures, Hydraulics and Drilling Optimisation. 6. Barrier Integrity for CO2 (carbon storage) Injectors, and Material Selections to Mitigate CO2 Integrity Risks.

## Module Delivery

The module will be delivered by means of face to face and hybrid (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 | 43 | 25 |
| Non-Contact Hours | 107 | 125 |
| 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, 4, 5 |
|---|---|---|---|---|---|
| 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 |

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## Module Requirements

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|---|---|
| Prerequisites for Module | Normally a 2.2 UK honours degree in Engineering or a related discipline, and proficiency in English language for academic purposes (or IELTS score of 6.5 or equivalent). |
| 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. |

## ADDITIONAL NOTES

Part Time refers to Online Learning Part Time.

## INDICATIVE BIBLIOGRAPHY


| | |
|---|---|
| 1 | AADNOY, B.S., 2010. Modern well design. CRC Press |
| 2 | BOURGOYNE, A.T., MILLHEIM, K.K., CHENEVERT, M.E. and YOUNG, F.S., 1986. Applied drilling engineering. Richardson, Texas: Society of Petroleum Engineers. |
| 3 | CAENN, R., DARLEY, HCH., and GRAY, GR. 2017. Composition and Properties of Drilling and Completion Fluids. Elsevier, Gulf Professional Publishing. |
| 4 | GEFEI, L. 2021. Applied Well Cementing Engineering. Gulf Professional Publishing. |
| 5 | JONATHAN, B. 2009. Well completion design. Elsevier Science & Technology. |
| 6 | RABIA, H. 1985. Oilwell Drilling Engineering. Graham and Trotman. |
| 7 | ROBINSON, H. and GARCIA, J. 2015. Drillers knowledge book: creative solutions for today's drilling challenges. Houston, Texas: International Association of Drilling Contractors. |
| 8 | Journal articles, conference proceedings, and appropriate websites. Example OnePetro, Knovel, ASME. |