WELL COMPLETION

INSTITUTE FOR PROFESSIONAL AND EXECUTIVE DEVELOPMENT

United Kingdom

UNIT SPECIFICATION

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Unit Title

Well completion

Credit value

The credit value for this unit is 30 30 credits equivalent to 300 hours of teaching and learning (10 hours is equivalent to 1 credit) Guided learning hours (GLH) = 50 hours GLH includes lectures, tutorials and supervised study. This may vary to suit the needs and requirements of the learner and/or the approved centre of study. Directed learning = 50 hours: This includes advance reading and preparation, group study, and undertaking research tasks. Self-managed learning = 200 hours: This includes completing assignments and working through the core and additional reading texts. It also includes personal research reading via other physical and/or electronic resources.

Learning outcome Learner will:	**Assessment criteria** Learner can:
1.0 Understand how a well is cased	1.1 Evaluate the importance of casing a well 1.2 Describe how a well is cased to total depth 1.2.1 Examine the functions of the conductor casing, surface casing, intermediate casing and production casing 1.2.2 Examine the factors that influence the decision about which production casing to use; either solid or slotted 1.3 Give an account on how a cement job is done 1.3.1 Describe how a well is conditioned prior to a cement job 1.3.2 Examine the types of cement additives used in a cement job and their respective functions (e.g. accelerators, retarders, lightweight additives, heavyweight additives, extenders, antifoam additives and bridging agents) 1.3.3 Explain the meaning of multistage cementing 1.4 Examine the functions of the various tools used during well casing (e.g. centralizers, collars, thread protectors, wall scratchers, guide shoes, casing elevators, casing tongs, casing hangers etc.) 1.5 Explain what is meant by a casing programme 1.6 Evaluate the significance of performing a Mechanical Integrity Test during well casing
2.0 Understand the use of tubing in well completion	2.1 Describe the features of tubing 2.2 Examine the tools used together with tubings (e.g. collars, tubing packers, tubing anchors, seating nipple, subsurface safety valve) 2.3 Explore the purpose of using tubing in well completion 2.4 Examine when a tubing may not be used in a well completion 2.5 Explore the nature of multiple completions

3.0 Understand the nature of bottom-hole completions	3.1 Evaluate the following techniques used in bottom-hole completions and examine the appropriate conditions under which each one may be used ○ Open hole/barefoot completion ○ Gravel pack completion ○ Uncemented slotted linear ○ Set through completion
4.0 Understand the features and functions of wellhead equipment	4.1 Examine the features of the casinghead and describe its functions 4.1.1 Examine the casinghead-blowout preventer (BOP) stack connection 4.1.2 Explain when a wellhead is said to be unitized 4.2 Describe the features of the tubinghead and describe its functions 4.2.1 Examine the use of tubing hungers 4.3 Examine the parts of a Christmas tree (e.g. master valve, flow valve, swab valve, pressure gauge, choke) and describe their respective functions 4.3.1 Describe when the installation of a Christmas tree on a well becomes necessary 4.3.2 Explain why flow rates are controlled in a production well
5.0 Understand how produced oil and gas is lifted to the surface artificially	5.1 Describe when an artificial lift is required on a well 5.2 Examine the use of a sucker rod pump 5.2.1 Describe the types of sucker rod pumps (insert or rod pump, tubing pump, casing pump) 5.2.2 Examine the problems that may be encountered in the use of sucker rod pumps (fluid pound, gas lock)

	5.3 Explore the use of the beam pumping unit 5.3.1 Identify the parts of a beam pumping unit 4.3.2 Differentiate between a beam-balanced rod pumping unit, air balanced beam pumping unit and a Mark II rod pumping unit 5.4 Evaluate the use of gas lift 5.4.1 Examine the advantage and disadvantage of using gas lifts 5.5 Evaluate the use of the electric submersible pump 5.6 Evaluate the use of the hydraulic pump 5.6.1 Differentiate between the parallel-free pump and the casing free pump
6.0 Understand the nature of subsea well completion	6.1 Evaluate the methods by which installation and work on a well underwater can be done: ○ By using a saturation diver ○ By using a diver in one-atmosphere diving suit (ADS) ○ By using a remotely operated vehicle 6.2 Examine the wellhead equipment used in subsea completions 6.3 Describe the nature of wet and dry subsea completions 6.4 Explore how production from a subsea well is taken by flowlines through to the floating production, storage and offloading (FPSO) vessel. 6.4.1 Describe the functions of a floating production, storage and offloading (FPSO) vessel
7.0 Understand the significance of special purpose cased-hole logging tools	7.1 Explore the functions of cement bond logs, casing-collar locator logs, temperature log, casing inspection log, flowmeter, radioactive tracer, acoustic image log

Recommended learning resources

Indicative reading	Hydrocarbon exploration and production by Graham et al (2008). ISBN: 978-0444532367 • For a full list of textbooks and publications relevant to this unit, please contact IPED - UK.
Learning Aid	A learning resource material is provided to guide the learner/tutor and to serve as a quick reference point for contents of the programme. The student is advised not to be over reliant on the study guide but to access the relevant textbooks or other academic materials as much as possible to help him/her with the course.