
Summary

This is a package of courses will provide geologists, geophysicists and related sub-surface technical disciplines with foundation knowledge of Reservoir and Production Engineering and Well Completions.

EC025 - Well Planning and Drilling Operations provides an overview of the phases, operations, and terminology used in the design and drilling of a well. No prior experience or knowledge of drilling operations is required and as such this course is ideal for early career professionals or non-technical staff involved in the drilling industries. Through the extensive use of visual examples and interactive content the course will provide participants with a better understanding of well design, planning and drilling operations. Consideration will also be given to Health, Safety and Environmental considerations necessary when drilling a well.

EC026 - Reservoir Engineering and Well Optimisation covers about the mechanisms which drive oil and gas from the reservoir, through the well to the wellhead at the surface, and the engineering techniques used to predict and optimise production. Natural reservoir drive mechanisms will be investigated as well as techniques that can be used to stimulate and maximise production prior to considering Enhanced Oil Recovery (EOR) processes. The learner will develop an understanding of reservoir modelling to help quantify recovery factors and develop an appreciation for the most appropriate recovery technique to use in a given production situation.

EC027 - Well Completion Technology provides an introduction to well completion design which is one of the most critical steps for oil and gas wells. An optimal design leads to a well being capable of delivering its full potential Completion design is a complex process, as it includes input from many disciplines and considers the whole life cycle of the well not just a single point in time, without compromising on safety or reliability. Well performance changes over time due to a variety of factors, at surface and in the reservoir, and a properly designed well allows for easy modification (workovers) to correct or enhance performance. Completion design is a complex process as it includes input from many disciplines and considers the whole life cycle of the well, not just a single point in time.

EC028 - Well Production Operations covers oilfield production operations from the wellhead to the point of sale. The learner will be introduced to equipment selection, function and modification and how these decisions relate to the wider E&P lifecycle, the broader production system and the regulatory environment in which they are operating. The course discusses function and malfunction, routine operations and common day to day activities as well as introducing the unique language used in Production Operations. This course is designed to familiarise learners with the basic aspects of crude oil and natural gas production and the common processes and equipment used in gathering and processing for operations.

Learning Outcomes

Participants will:

EC025 - Well Planning and Drilling Operations

1. Learn about the different types of well, the key aspects of the well design and planning process and the importance of health and safety when planning and drilling a well.
2. Become aware of the key components of a drilling programme, including drilling fluids, casing and cementing.
3. Develop an understanding of surface and subsurface geohazards, planning a site survey and drilling a relief well.
4. Learn about the systems and components on a drilling rig, their purpose and function.
5. Become familiar with the different personnel on a rig, their roles and responsibilities alongside the monitoring and reporting activities that happen during drilling operations.
6. Understand the social implications surrounding drilling operations in conjunction with the major waste and emissions streams and how these can be managed.

EC026 - Reservoir Engineering and Well Optimisation

1. Learn how to define well inflow and outflow and how to use this information to estimate overall well performance.
2. Demonstrate how the 'Material Balance' technique can be used to describe and analyse recovery from both oil and gas reservoirs.
3. Define how water injection can be used to improve recovery and how the resultant production performance can be evaluated.
4. Learn about the different types of Enhanced Oil Recovery, the benefit that can be obtained and the key engineering concepts involved in an EOR project

EC027 - Well Completion Technology

1. Understand key considerations and workflow of completion design.
2. Optimise tubing based on flow requirements and well performance analysis.
3. Calculate stresses and loads on tubing and connections.
4. Select proper tubing material for the well environment and fluid type.
5. Differentiate between open hole, cased and perforated completions.
6. Select well stimulation techniques based on reservoir and fluid type.
7. Describe the purpose and generic operating principles for major completion components.

EC028 - Well Production Operations

1. Learn how the petroleum system and global economics can affect field production and development decisions.
2. Recognize the characteristics of crude oil and natural gas that impact flow and processing.
3. Illustrate the range of surface facilities available, including oil and gas separators, injection systems

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Format and Duration
Self-Paced - 14 Hours

and water disposal systems.

4. Discuss uncertainty around production and development design.
5. Develop an understanding of production optimisation and how to successfully model production outcomes.

Training Method

This is a bundle of self-paced e-learning courses totalling ~14 hours of learning time. Learning materials are structured into short sections, each including interactive text and image content, animations, video, and audio. End of course quizzes are scored to provide the learner with their learning progress.

Who Should Attend

This is a package of courses is for geologists, geophysicists and related sub-surface technical disciplines who require foundation knowledge of Reservoir and Production Engineering.

Course Content

EC025 - Well Planning and Drilling Operations

Well Planning & Design - This module provides an overview of the different aspects of well planning and design. It will cover types of well commonly drilled in the energy industry and the data required to develop a well plan prior to the commencement of drilling operations. Participants will also learn the basic components of a drilling programme, consider the importance of environment, health and safety when planning a well and be introduced to some of the terminology commonly used in the energy industry.

Geohazards - This module will examine the various geohazards associated with delivering exploration wells safely. This will include seabed and sub-surface hazards, fault identification and avoidance, and depositional architecture from seismic and fluid identification (DHIs). We will also explore shallow gas hazards, and geomechanical hazards before concluding with risk and mitigation strategies.

Drilling & Equipment Function - This module introduces rotary drilling and explains the different types of rigs used in the drilling industry. The module will cover common operations employed while drilling before focusing on the 6 primary systems found on drilling rigs, their purpose and function.

Drilling Operations - This module explores the roles and responsibilities of different personnel on a rig and the data that is acquired and used to monitor drilling and report back to the subsurface team. Aspects of operations such as waste disposal, wider social implications and operational health and safety are also reviewed.

EC026 - Reservoir Engineering and Well Optimisation

Well Performance and Artificial Lift - This module will introduce the terminology commonly used in the field of well performance and optimisation. The learner will consider the journey of the fluids from the

reservoir, or 'sand face', at the bottom of the well up to the wellhead. The relationship between flowrate and pressure will be illustrated as well as how these can be successfully modelled to improve understanding of well performance before and after stimulation. Finally artificial lift techniques that can be used to enable, improve or sustain production to surface will be discussed.

Reservoir Drive Mechanisms - This module looks at the different types of reservoir drive that enable production from oil and gas wells along with potential recovery factors that can be expected. The participant will learn how to analyse and quantify recovery using the material balance technique in both oil and gas reservoirs. Fractured reservoirs and the concept of sudation will be considered before finally looking at how water injection can be used to aid and maximise recovery.

Enhanced Oil Recovery - This module looks at how recovery from an oil reservoir can be improved beyond natural depletion or simple injection techniques. Thermal, miscible and chemical processes are considered as well as the operations and conditions most suited to each. The learner will develop an understanding of screening reservoirs for potential EOR and the operational facilities and key chemical and engineering concepts required to maximise recovery.

EC027 - Well Completion Technology

Well Completion Design Process - The 1st module of this course will define well completion, introduce the range of completion options available and the processes required to reach a final basis of design. The learner will develop an understanding of completion components and options for both horizontal and multi-lateral wells.

Well Completion Tubing Design - This module teaches the learner about the purpose and importance of tubing within the context of well completion. It covers how to estimate stress and loading on tubing and connections and how to select tubing to optimise flow and performance.

Overview of Key Well Completion Technologies - This module looks at the difference between open hole, cased and perforated completions. The learner will understand how to select well stimulation techniques based on reservoir and fluid types, how to control sand production and how to design for high pressure and temperature environments. Finally heavy oil production techniques will be considered.

Completion Components - In the final module of this course the learner will increase their understanding of major completion equipment components and develop further understanding of sand and inflow control equipment.

EC028 - Well Production Operations

Overview of Oil and Gas Production Systems - This module will introduce the concept of Production Systems. The learner will consider the different influences of the petroleum system and the wider economic climate when designing a suitable production system. Risk and uncertainty relating to the production system design will be discussed as well as the range of different production system designs that may be suitable at upstream, midstream and downstream phases of a field lifecycle.

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Oil and Gas Treatment Systems - This module introduces the learner to the characteristics of crude oil and natural gas that impact flow and processing and therefore must be understood when producing and treating hydrocarbons. The module will demonstrate that production of hydrocarbons is accompanied by production of water and the separation, storage, treatment and disposal of the produced water will be discussed alongside typical oil and gas treatment processes. Finally drains, flares and vent systems will be introduced alongside best practice with respect to local regulations and the environment.

Injection Systems and Production System Optimisation - The final module in this course teaches about injection systems, including waterflooding, gas, steam and CO₂ injection. The learner will develop an understanding of where and when these are used and the factors to consider when designing an injection system. The module will also cover gas storage and the relationship between storage and demand. Finally, production optimisation will be discussed alongside how to successfully model production outcomes to meet a desired objective.