



Learners explore how to solve and engineering problem using design

Learning Content

Learners are able to use and apply advanced electrical, electronic, mechanical and mathematical principles to solve complex and unfamiliar engineering and mathematical problems directly, indirectly and synoptically. They can provide balanced responses showing developed understanding and evaluation of complex familiar and unfamiliar engineering problems. They can interpret and evaluate diagrams, graphical information and systems, using their knowledge and understanding to solve complex familiar and unfamiliar problems. They can select and implement appropriate advanced procedures to provide justified and optimised solutions for given engineering and mathematical situations. They use appropriate and technically accurate engineering and mathematical terminology consistently. Learners can propose solutions to problems, drawing on their knowledge and understanding of electrical, electronic, mechanical and mathematical principles.

Unit Overview

Engineering products are part of our daily lives, from aircraft to the smallest electronic circuits found in medical devices. Engineering products are designed as a result of the identification of a need or opportunity, and then engineers using creative skills and technical knowledge to devise and deliver a new design or improvements to an existing design. For example, advances in the development of fuels led to the first internal combustion engine, and engineers have been improving its design ever since. In this unit, you will examine what triggers changes in the design of engineering products and the typical challenges that engineers face, such as designing out safety risks. You will learn how material properties and manufacturing processes impact on the design of an engineering product. Finally, you will use an iterative process to develop a design for an engineering product by interpreting a brief, producing initial ideas and then communicating and justifying your suggested solution. To complete the assessment task within this unit, you will need to draw on your learning from across your programme. It is important that engineers use creative and technical knowledge, understanding and skills to transform ideas into viable products, and that they understand the critical importance of this activity in ensuring that products are both safe and effective. This unit will help prepare you for an engineering apprenticeship, engineering courses in higher education or for technician-level roles in a variety of engineering sectors.

Learning Outline:

- AO1** Demonstrate knowledge and understanding of engineering products and design
- AO2** Apply knowledge and understanding of engineering methodologies, processes, features and procedures to iterative design
- AO3** Analyse data and information and make connections between engineering concepts, processes, features, procedures, materials, standards and regulatory requirements
- AO4** Evaluate engineering product design ideas, manufacturing processes and other design choices
- AO5** Be able to develop and communicate reasoned design solutions with appropriate justification

Command or term	Definition
Client brief	Outlines the client's expectations and requirements for the product.
Design	A drawing and/or specification to communicate the form, function and/or operational workings of a product prior to it being made or maintained.
Manufacture	To make a product for commercial gain.
Project log	A document to record the progress made, key activities and decisions taken during the development of a project

Numeracy links:

Measurements
Units Interpretation and conversion

Work Related Learning:

Gaining knowledge to assist in a manufacturing or Engineering career.

SMSC and British Values

Understanding how design solutions can be used to solve many of the word issues