

## OCR Level 1/2 Cambridge National Certificate in Engineering Manufacture (601/1219/0)

### Who is this qualification for?

This qualification is for students aged 14–16 who wish to develop knowledge and skills in manufacturing engineered products.

### What will the student study as part of this qualification?

All students will study four topics.

- Engineering materials, processes and production:
  - properties and uses of engineering materials
  - manufacturing processes
  - modern production technologies.
- Preparing and planning for manufacture:
  - planning of safe working processes
  - reviewing production plans
  - using tools and machines to make preproduction prototypes.
- Computer aided manufacturing (CAM):
  - planning to use computer numerical control (CNC) machines
    - milling machines
    - routers
  - interpreting and transferring information from computer aided design (CAD) packages to CNC equipment
  - setting up CNC equipment
  - understanding the wider applications of computer controlled processes to manufacture products, e.g. robotics.
- Quality control of engineered products:
  - assessing product quality using appropriate techniques
  - understanding the modern technologies used in quality control
    - 3D scanning
    - X-ray crack testing
  - the principles of 'lean' manufacturing
    - causes of waste
    - how to avoid excess waste in manufacturing
    - methods to reduce this.

## **What knowledge and skills will the student develop as part of this qualification and how might these be of use and value in further studies?**

The students will acquire the knowledge and skills required to operate both traditional and modern manufacturing tools and equipment. Their ability to make products in accordance with a design specification, and their understanding of the processes and systems required to transfer a design concept into a quality mass produced product, will be developed.

Students will be able to identify different types of engineering materials and their uses; they will be familiar with the purpose and uses of a variety of production processes in the industry.

Students' skills in preparing and planning for the production of a manufactured item will be developed. They will understand the principles of mass production, including preproduction and production processes.

Students will learn the principles of CAM, developing knowledge and skills that enable them to use related software and equipment. They will acquire and be able to apply knowledge relating to the quality control of engineered products when assessing the quality of engineered products.

This qualification provides a valuable foundation in engineering manufacture, preparing students for further study qualifications in Engineering, Business, Computer Science, Art and Design and other related careers. Alternatively, the qualification prepares for those wishing to go on to an apprenticeship in a wide range of engineering related subjects. The skills and knowledge gained are directly useful for practical application in the workplace.

## **Which subjects will complement this course?**

The Cambridge National Certificate in Engineering Manufacture is equivalent in size to a GCSE and will take 120 guided learning hours (GLH) to deliver.

The qualification is complemented by a wide range of GCSEs including Maths, Chemistry, Physics, Computer Science, Business Studies and Economics. It can be delivered alongside the other vocational courses such as ICT and Business or other qualifications from the suite of Level 1/2 Cambridge Nationals in Engineering which includes Cambridge Nationals in Engineering Design, Systems Control in Engineering and Principles in Engineering and Engineering Business.

The Cambridge Nationals in Systems Control in Engineering focusses on topics such as electronic principles, simulation, construction and testing of electronic circuits, engineering applications of computers and process control systems.

The Cambridge Nationals in Principles of Engineering and Engineering Business focusses on topics such as engineering principles, the engineered business world, sustainable engineering and optimising performance in engineering systems and products.

The Cambridge Nationals in Engineering Design focusses on topics such as design briefs and design specifications, product analysis and research, developing and presenting engineering designs and 3D design realisation.

In addition to this Certificate in Engineering Manufacture, there is an Award that is 60glh, which is only half of the time it takes to deliver a GCSE, and made up of only two topics, *Engineering materials, processes and production* and *Preparing and planning for manufacture*. Both of these topics are also mandatory in this Certificate and have been outlined above.

This Award will give the student a foundation of some of the essential electronics knowledge and skills involved in engineering manufacture and is designed to be taken alongside other qualifications.

Schools and Colleges should note that the Certificate-sized qualification is the only qualification in this suite that is eligible for inclusion in Performance Tables.