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OCR Level 1/2 Cambridge National Certificate in Systems Control in Engineering (601/1407/1)

Who is this qualification for?

This qualification is for students aged 14–16 who wish to develop knowledge and skills in electronic principles and the function and operation of computer systems which control engineering processes.

What will the student study as part of this qualification?

All students will study four topics.

- Basic electronic principles and principles which underpin how electronic components operate (e.g. electronic circuit hardware):
  - methods of testing electronic circuits
  - how circuits for commercial use are constructed.

- How to simulate, construct and test electronic circuits:
  - using computer aided design (CAD) for circuit simulation and design
  - constructing circuits
  - testing circuits visually
  - testing circuits physically.

- Engineering applications of computers:
  - how computers are used in engineering, design, manufacture and process control, e.g.
    - computer aided manufacture (CAM)
    - systems
    - systems which monitor production operations/stock control
  - computers which are used to monitor and maintain systems
  - computers which are used to process and communicate data about production and maintenance.

- Process control systems:
  - how microprocessors/microcontrollers are used to control engineered products
  - design, develop and simulate a simple control system solution
  - test a control system.

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 gain a detailed basic knowledge of fundamental electronic principles. They will cover amps and volts, circuit components, types of power source available, cable types, capacitors, switches and semiconductors. The type of knowledge and practical skills the students will develop include how basic electronic components work, how to test electronic circuits including fault and hazard identification. They will understand how circuits are constructed commercially.

Students will develop the ability to simulate using CAD software and will develop the practical ability to construct and test electronic circuits.

Students will learn how computers are used to control engineering systems including CAM, automation of production operations, stock control and other manufacturing uses. They will gain an awareness of the use of computers in maintenance, both to diagnose faults and to correct them. Students will understand how and why computers are used for transmitting data (during production), maintenance and stock control (e.g. data loggers, remote monitoring systems).

This qualification provides a thorough grounding in electronic engineering principles which will prepare the student for higher level study in Electronic Engineering, Computer Science and Electronics. Alternatively, the qualification provides a foundation for those wanting to progress on to an apprenticeship in a wide range of engineering related subjects.

Which subjects will complement this course?

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

The qualification is complemented by a range of GCSEs including Maths, 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 Manufacture, Principles in Engineering and Engineering Business and Engineering Design.

The Cambridge Nationals in Engineering Manufacture focusses on topics including engineering materials, processes and production, preparing and planning for manufacture, computer aided manufacturing and the quality control of engineered products.

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 Systems Control in Engineering, 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, *Electronic Principles* and *Simulate, construct and test electronic circuits*. 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 systems control in engineering 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.