Advanced Higher Course Specification

Advanced Higher Engineering Science

Course code:	C823 77
Course assessment code:	X823 77
SCQF:	level 7 (32 SCQF credit points)
Valid from:	session 2019–20

This document provides detailed information about the course and course assessment to ensure consistent and transparent assessment year on year. It describes the structure of the course and the course assessment in terms of the skills, knowledge and understanding that are assessed.

This document is for teachers and lecturers and contains all the mandatory information required to deliver the course.

This edition: September 2019 (version 2.0)

Contents

Course overview

This course consists of 32 SCQF credit points, which includes time for preparation for course assessment. The notional length of time for candidates to complete the course is 160 hours.

The course assessment has two components.

Component	Marks	Duration
Component 1: question paper	75	2 hours and 30 minutes
Component 2: project	75	see 'Course assessment' section

Recommended entry	Progression
Entry to this course is at the discretion of the centre. Candidates should have achieved the Higher Engineering Science course or equivalent qualifications and/or experience prior to starting this course.	♦ a range of engineering-related Higher National Diplomas (HNDs) ♦ degrees in engineering and other related disciplines ♦ careers in engineering ♦ further study, employment and/or training

Conditions of award

The grade awarded is based on the total marks achieved across both course assessment components.

Course rationale

National Courses reflect Curriculum for Excellence values, purposes and principles. They offer flexibility, provide time for learning, focus on skills and applying learning, and provide scope for personalisation and choice.

Every course provides opportunities for candidates to develop breadth, challenge and application. The focus and balance of assessment is tailored to each subject area.

Engineering brings together elements of technology, science and mathematics, and applies these to real-world challenges. This course provides an excellent opportunity to make links across learning in the senior phase.

Engineers play key roles in meeting the needs of society in fields that include climate change, medicine, IT, and transport.

The course encourages candidates to become successful, responsible and creative in using technologies and to develop a range of qualities, including independence, flexibility, perseverance, confidence and enterprise.

Purpose and aims

The course builds on the knowledge and understanding, and practical skills developed in the Higher Engineering Science course and provides a bridge towards further study in any branch of engineering.

The course provides a broad and challenging exploration of engineering, enabling candidates to:

- extend and apply knowledge and understanding of key engineering concepts, principles and practice through independent learning
- understand and apply the relationships between engineering, mathematics and science
- develop skills in investigation and research in an engineering context
- analyse, design, construct and evaluate creative solutions to complex engineering problems
- communicate advanced engineering concepts clearly and concisely, using appropriate terminology
- develop an informed understanding of the role and impact of engineering in changing and influencing our environment and society, including ethical implications

Who is this course for?

This course is suitable for candidates who are interested in developing a deep understanding of the central role of engineers as designers and creative problem solvers. Candidates have opportunities to conceive, design, implement, and control complex engineering systems.

Candidates should be able to respond to a broad and challenging exploration of engineering. They should be able to demonstrate a mature approach to learning and the ability to work on their own initiative with minimal supervision.

Course content

The course develops skills in three main areas. Candidates apply these skills in a range of contexts, within the broad discipline of engineering.

Engineering project management
Candidates develop knowledge and skills of project management, as it applies to an engineering project. They investigate real-world engineering projects, and consider environmental, social and ethical impacts. Candidates select an appropriately challenging engineering problem, carry out research relating to the problem, and develop a proposal for a solution to the problem.

Electronics and control
Candidates explore a range of key concepts and devices related to electronic control systems. They develop mathematical techniques, and skills in problem solving and evaluating, through simulation and practical projects. Candidates select and investigate an aspect of engineering related to electronic, electrical, or control engineering, and apply this in practical situations.

Mechanisms and structures
Candidates develop a deep mathematical understanding of mechanisms and structures. They develop skills in problem solving and evaluating through simulation, practical projects and investigative tasks in a range of contexts. Candidates select and investigate an aspect of engineering related to mechanical or civil engineering, and apply this in practical situations.

Skills, knowledge and understanding

Skills, knowledge and understanding for the course

The following provides a broad overview of the subject skills, knowledge and understanding developed in the course:

- researching and investigating complex engineering problems
- designing, developing, simulating, building, testing and evaluating solutions to complex engineering problems in a range of contexts
- applying mathematical techniques to analyse and solve engineering problems
- communicating complex engineering concepts clearly and concisely, using appropriate terminology
- knowledge and understanding of the wide role and impact of engineering on society and the environment, including ethical implications
- in-depth knowledge and understanding of aspects of electronic and microcontroller-based systems, and their application
- in-depth knowledge and understanding of aspects of mechanisms and structures, and their application
- knowledge and understanding of the relevance of energy, efficiency and sustainability to complex engineering problems and solutions
- applying engineering knowledge and understanding, and skills in a range of contexts
- ability to plan, manage and implement a challenging engineering project

Skills, knowledge and understanding for the course assessment

The following provides details of skills, knowledge and understanding sampled in the course assessment.

Course themes	
The systems approach	♦ using system, sub-system and control diagrams to analyse complex engineering systems (including time- and event-based systems)
Energy and efficiency	♦ using energy audits and cost implications to inform engineering decisions ♦ applied calculations involving efficiency, work done and power, in complex situations, using: $E_w = Fd$ $P = E/t$, $E_k = ½ mv^2$ $E_p = mgh$ $E_e = VIt$ $E_h = cm\Delta T$ Efficiency $\eta = E_{out}/E_{in} = P_{out}/P_{in}$
Calculations	♦ extracting data to use in analysis and calculations ♦ manipulating and combining given formulae to obtain answers ♦ solving simultaneous equations ♦ solving quadratic equations ♦ applying trigonometric techniques ♦ using integration and differentiation in familiar contexts

Engineering project management	
Engineering roles and disciplines	♦ research and development ♦ resource management ♦ time management (including critical path analysis and Gantt charts) ♦ cost allocation management (capital costs, direct costs, indirect costs, and oncosts) ♦ project life cycle planning
Impacts of engineering	♦ social and economic impacts of engineering ♦ sustainability and environmental impacts of engineering
Real-world engineering projects	♦ selecting contemporary, innovative, and real-world projects ♦ reporting on project development and management ♦ reporting on environmental, social and ethical impacts of projects

Electronics and control	
Analogue electronics	♦ Kirchhoff's laws and nodal analysis (with two unknowns) of circuits ♦ designing transistor biasing circuits for a given output load for class A amplifier circuits, by using BJT and MOSFET transistors, a DC load line and Q-point, and voltage-divider biasing ♦ Schmitt triggers, including using them to produce square waves ♦ integrating amplifiers ♦ using 555 and Wien bridge oscillators to generate shaped waveforms and clock signals
Digital electronic control systems	♦ interfacing microcontrollers: — connecting digital and analogue input devices (including a conditioning circuit to suit ADC input, if required) — connecting digital and analogue output devices (including drive circuits or relay interfaces, if required) ♦ principles and applications of A-D conversion: — ADC designs relating to speed, linearity of conversion, and resolution — calculating anticipated binary output for a given analogue input ♦ principles and applications of D-A conversion — calculating analogue output for a known binary input, based on a summing amplifier ♦ developing programs using an appropriate high-level language to solve control problems involving multiple inputs and outputs, and proportional control ♦ using a range of constructs which include input, output, branching, loops (fixed, continuous, and nested), time delays, logic and arithmetical operations, and subroutines
Generation and transmission	♦ basic principles and examples of electrical power generation ♦ basic principles of electrical power transmission, including: — transformers (busbar and circuit breaker) — advantages of AC — main components of the national grid (step-up and step-down transformers, high voltage transmission, and control centre) ♦ AC-DC and DC-AC conversion
Investigation	♦ researching a relevant electronic, electrical, or control engineering topic ♦ reporting on the research and findings of a relevant electronic, electrical, or control engineering topic
Simulation and/or construction	♦ complex electronic and programmable control systems

Mechanisms and structures	
Drive systems	♦ analysing and calculating forces and torque within drive systems, comprised of spur gears and/or belts and pulleys
Structures and forces	♦ free body diagram for a beam under the action of gear or pulley forces ♦ using equations of equilibrium for simply supported beams (including forces acting in three dimensions, by resolving into two orthogonal planes) and cantilever beams ♦ bending moment diagrams and shear force diagrams
Materials	♦ second moment of area ♦ general beam bending equation ♦ maximum values of deflection for cantilever, simply supported beams and built-in beams, subject to either a point load or a uniformly distributed load (UDL)
Investigation	♦ researching a relevant mechanical, structural, or civil engineering topic ♦ reporting on the research and findings of a relevant mechanical, structural, or civil engineering topic
Simulation and/or construction	♦ complex mechanisms or structures

Skills, knowledge and understanding included in the course are appropriate to the SCQF level of the course. The SCQF level descriptors give further information on characteristics and expected performance at each SCQF level, and are available on the SCQF website.

Skills for learning, skills for life and skills for work

This course helps candidates to develop broad, generic skills. These skills are based on SQA's Skills Framework: Skills for Learning, Skills for Life and Skills for Work and draw from the following main skills areas:

2 Numeracy

2.1 Number processes
2.3 Information handling

3 Health and wellbeing

3.1 Personal learning

4 Employability, enterprise and citizenship

4.2 Information and communication technology (ICT)

5 Thinking skills

5.3 Applying
5.4 Analysing and evaluating

Teachers and lecturers must build these skills into the course at an appropriate level, where there are suitable opportunities.

Course assessment

Course assessment is based on the information in this course specification.

The course assessment meets the purposes and aims of the course by addressing:

- breadth — drawing on knowledge and skills from across the course
- challenge — requiring greater depth or extension of knowledge and/or skills
- application — requiring application of knowledge and/or skills in practical or theoretical contexts as appropriate

This enables candidates to:

- develop engineering skills, knowledge and understanding of applying mathematical techniques in engineering, and knowledge and understanding of key engineering concepts
- apply the knowledge and skills developed in practical and theoretical contexts
- demonstrate aspects of challenge and application in a practical context — candidates apply knowledge and skills to develop, implement, evaluate, and report on a solution to an appropriately challenging and complex engineering problem
- demonstrate aspects of breadth and application in theoretical contexts — candidates apply breadth of knowledge and depth of understanding, to answer appropriately challenging questions in engineering contexts

Course assessment structure: question paper

Question paper 75 marks

The question paper has a total mark allocation of 75 marks. This is 50% of the overall marks for the course assessment.

It gives candidates an opportunity to demonstrate skills, knowledge and understanding in the following areas:

Area	Range of marks
Course themes and engineering project management	10–15
Analogue electronics	10–15
Digital electronics and programmable control	10–15
Generation and transmission	5–8
Drive systems	4–6
Structures	12–19
Materials	6–12

The question paper has two sections:

Section 1 has 35 marks, and consists of short, context-based questions from specific topics.

Section 2 has 40 marks, and consists of structured, context-based questions that integrate content from across the course.

A proportion of marks are available for more challenging questions that generally require interpretation and/or integration of more complex engineering contexts. This challenge could be in the complexity of the expected response, the descriptions and/or justifications of more detailed complex processes, problem solving, and transposition of formulae or substitution of results from one formula to another.

Questions allow for a variety of response types, including calculations, short or limited responses and extended responses.

Where required, sections of code are presented in both Arduino C and PBASIC, but candidates can respond in any appropriate language.

SQA provides candidates with a data booklet containing relevant data and formulae for the examination.

Setting, conducting and marking the question paper

The question paper is set and marked by SQA, and conducted in centres under conditions specified for external examinations by SQA.

Candidates have 2 hours and 30 minutes to complete the question paper.

Specimen question papers for Advanced Higher courses are published on SQA's website. These illustrate the standard, structure and requirements of the question papers. The specimen papers also include marking instructions.

Course assessment structure: project

Project 75 marks

The project is a problem-solving activity, with a number of stages that candidates must complete.

It assesses candidates' ability to work independently, applying engineering science skills and knowledge acquired and developed during the course.

Candidates choose a context or situation appropriate to the assessment task. However, it is important that teachers and lecturers discuss potential project ideas with candidates, to ensure that they involve sufficient complexity and challenge for Advanced Higher. This includes making sure that the project is achievable within the constraints of time, expertise and resources available.

The project has a total mark allocation of 75 marks. This is 50% of the overall marks for the course assessment. Marks are awarded for:

Area	Marks
Outline	5
Research, analysis and specification	15
Production and maintenance of a detailed project plan	10
Mathematical modelling and analysis	15
Constructing and/or simulating a solution	15
Evaluation	10
Presentation	5

The project provides an opportunity for candidates to:

- identify and analyse an engineering problem or issue
- demonstrate engineering science skills and creativity
- design and construct and/or simulate a solution to the engineering problem or issue
- evaluate the solution to the engineering problem or issue

Setting, conducting and marking the project

The project is:

- an open assessment task set by SQA
- conducted under some supervision and control
- internally assessed in line with SQA's marking instructions

All marking is quality assured by SQA.

Assessment conditions

Time

There is no time limit for the project. Candidates work on the project throughout the academic session.

Supervision, control and authentication

The project is conducted under some supervision and control.

Candidates work on their projects outwith the normal learning and teaching setting, therefore, teachers and lecturers must exercise professional responsibility to ensure that evidence submitted by a candidate is their own work.

Candidates must complete their own projects and must not work in groups.

Resources

This is an open-book assessment. Candidates can access any appropriate resources.

Reasonable assistance

Candidates must carry out the project independently. However, teachers and lecturers can provide reasonable assistance prior to, and during, the formal assessment process.

Once project work is completed and assessed, it must not be returned to candidates for further work to improve their marks.

Evidence to be gathered

Full details of the evidence required is contained within the assessment task. This typically includes:

- prints from simulation software
- photographs of built models
- records of testing
- an evaluation

Teachers and lecturers must keep this evidence for quality assurance purposes.

Volume

There is no word count.

Grading

Candidates' overall grades are determined by their performance across the course assessment. The course assessment is graded A–D on the basis of the total mark for both course assessment components.

Grade description for C

For the award of grade C, candidates will typically have demonstrated successful performance in relation to the skills, knowledge and understanding for the course.

Grade description for A

For the award of grade A, candidates will typically have demonstrated a consistently high level of performance in relation to the skills, knowledge and understanding for the course.

Equality and inclusion

This course is designed to be as fair and as accessible as possible with no unnecessary barriers to learning or assessment.

Guidance on assessment arrangements for disabled candidates and/or those with additional support needs is available on the assessment arrangements web page: www.sqa.org.uk/assessmentarrangements.

Further information

- Advanced Higher Engineering Science subject page
- Assessment arrangements web page
- Building the Curriculum 3–5
- Guide to Assessment
- Guidance on conditions of assessment for coursework
- SQA Skills Framework: Skills for Learning, Skills for Life and Skills for Work
- Coursework Authenticity: A Guide for Teachers and Lecturers
- Educational Research Reports
- SQA Guidelines on e-assessment for Schools
- SQA e-assessment web page
- SCQF website: framework, level descriptors and SCQF Handbook

Appendix: course support notes

Introduction

These support notes are not mandatory. They provide advice and guidance to teachers and lecturers on approaches to delivering the course. Please read these course support notes in conjunction with the course specification and the specimen question paper and coursework.

Approaches to learning and teaching

At Advanced Higher, a significant amount of learning can be self-directed and requires candidates to demonstrate initiative and work on their own.

Some candidates may find this challenging, so it is important that you have strategies in place to support them, for example planning time for regular feedback sessions and/or discussions on a one-to-one or group basis.

You should encourage candidates to use an enquiring, critical and problem-solving approach to their learning. Provide opportunities for candidates to practise and develop research and investigation skills, and higher-order evaluation and analytical skills.

Engage candidates in a variety of learning activities appropriate to the subject, for example:

- independent research, rather than receiving information from teachers or lecturers
- using active and open-ended learning activities, such as research and case studies
- using the internet to assist research
- recording, in a systematic way, the results of research and independent investigation from different sources
- presenting findings and/or conclusions of research and investigation activities
- group work with peers and using collaborative learning opportunities to develop team working
- drawing conclusions from complex information
- using appropriate technological resources (for example web-based resources)
- visits to engineering sites

You can create opportunities for inclusive approaches to learning and teaching to suit the needs of all candidates by adopting a variety of learning and teaching strategies, and using technology in innovative and creative ways.

Where possible, provide opportunities to personalise learning to enable candidates to have choices in approaches to learning and teaching. The flexibility in the Advanced Higher course and the independence with which candidates carry out the work lends itself to this. In particular, give candidates the opportunity to:

- select and investigate a real-world engineering project in the ‘engineering project management’ area of study

- research aspects of engineering that interests them in both the 'electronics and control' and 'mechanisms and structures' areas of study
- plan, manage and implement a challenging engineering project on a topic they have chosen for their project

Areas of study

Engineering project management

You should encourage candidates to embark on their own independent investigation, providing support and guidance as required.

Examples of suitable projects include:

- a local civil engineering project (for example a road extension, new bridge or building, or a renovation project)
- an industrial process (for example the operation of a chemical plant or power station)
- a university-based research project (for example new designs for wave power generation devices)

Suitable projects can be large- or small-scale. They can be currently under development or recently completed, but they must involve engineering processes. The investigation could involve site visits, or be based on printed or online sources of information.

When investigating project management, candidates can consider aspects of research and development, resource management, time management, cost-allocation management, project life cycle planning and critical path analysis.

As part of their investigation, candidates may need teacher or lecturer input on developing a design proposal and project planning. The project plan could be a critical path analysis, an activity-on-node diagram or a Gantt chart. The plan should show each of the activities required to complete the proposal, the time required for each activity and the dependencies between activities.

Electronics and control

Possible learning activities include:

- analysing circuits using nodal analysis by:
  - labelling all circuit parameters and distinguishing unknown from known
  - identifying all nodes of the circuit
  - selecting a node as the ground node and giving it a potential of 0 V; all other voltages in the circuit are measured with respect to the ground node
  - labelling the voltages and polarities at all other nodes
  - applying Kirchhoff's current law at each node and expressing the branch currents in terms of the node voltages
  - solving the resulting two simultaneous equations for the node voltages

- designing transistor biasing circuits for a given output load
- calculating the switch-on and switch-off threshold values for a Schmitt trigger or an unknown resistor value if given one of the thresholds, and sketching a hysteresis curve of the output of a Schmitt trigger, showing the threshold voltages
- investigating and calculating values for a basic integrating op-amp used as a ramp generator
- calculating the frequency of a Wien bridge oscillator, using the expression $f=1/(2\pi RC)$
- studying the principles and applications of A-D conversion and D-A conversion
- investigating the basic principles of power generation, for example:
  - drawing a single-line schematic of the electricity supply system that includes interconnected generators; transmission systems; distribution systems; industrial and low voltage loads; relevant transformers; and small-scale generation — the schematic should show at least two feeders in all systems to allow for duality of supply and one spur feeder, and should be annotated with relevant voltage levels
  - explaining the function of each item of apparatus in the electricity supply system and the requirement of alternative feed routes
  - describing at least four energy sources and listing typical ratings for each, explaining load matching
- developing high-level language programs (this could be using C or another high-level control language) to solve control problems involving multiple inputs and outputs and proportional control
- creating programs that include input, output, branching, loops (fixed, continuous and nested), time delays, logic and arithmetical operations, and subroutines

Additionally, candidates should choose a topic or application within the broad areas of electronic, electrical or control engineering, carry out some research (this is most likely to be internet-based), and report on their findings.

Mechanisms and structures

Possible learning activities include:

- analysing and calculating forces and torque within drive systems, for example using Hooke's law as a workable approximation to determine the shear stress in a member with a torque applied to it (assuming a uniform shear stress in the member, the shear force can then be calculated)
- using tables of data to select materials and standard sections to meet a given requirement for a simple beam design by carrying out calculations to investigate a loaded beam, using the general bending equation
- using equations of equilibrium in a beam with type 1 and type 2 support
- applying the conditions of static equilibrium to complex structural systems, and carrying out calculations to determine the magnitude and direction of support reactions
- using beam analysis for forces acting in three dimensions by resolving into two orthogonal planes
- using free-body diagrams for a beam under the action of gear forces or pulley forces

- investigating complex plane triangulated frames by using the method of sections to determine the magnitude and nature of the internal forces in the members
- evaluating the distribution of shear force and bending moment for loaded beams by using free-body diagrams and calculations to determine the magnitude of support reactions; the shear force and bending moment applied to loaded beams can then be investigated and diagrams drawn up

Additionally, candidates should choose a topic or application within the broad areas of mechanical or civil engineering, carry out some research (this is most likely to be internet-based), and report on their findings

Suggested activities

During the course, candidates should develop the skills, knowledge and understanding required to complete the course assessments. You should ensure that the following activities are covered.

Investigate a real-world engineering project by:

- selecting a contemporary, innovative, real-world engineering project
- reporting on how the project has developed and is managed
- reporting on any environmental, social and ethical impacts of the project

Develop a design proposal and plan to solve a challenging engineering problem by:

- selecting a suitably challenging engineering problem
- producing an outline design proposal to solve the problem
- producing an outline project plan for implementing the proposal

Develop complex electronic and programmable control systems by:

- applying knowledge and understanding of digital and analogue electronics
- applying mathematical techniques
- simulating and/or constructing the systems

Investigate an aspect of engineering related to electronic, electrical or control engineering by:

- researching a relevant engineering topic
- reporting on the research and findings

Develop mechanical or structural solutions to solve complex problems by:

- applying knowledge and understanding of mechanisms or structures
- applying mathematical techniques
- simulating and/or constructing the solutions

Investigate an aspect of engineering related to mechanical, structural or civil engineering by:

- researching a relevant engineering topic
- reporting on the research and findings

Preparing for course assessment

You should give candidates opportunities to practise activities similar to those expected in the course assessment. For example, you could develop questions and tasks similar to those in the specimen question paper.

The course has time built in to prepare for course assessment. You can use this at your discretion at various points throughout the course for consolidation and support.

For the question paper, time is required for:

- revision and to consolidate learning
- question paper techniques
- familiarisation with past, specimen, and sample question papers
- practice question paper(s) – for example prelim examination

For the project, time is required for:

- revision and to consolidate learning
- guidance on recording progress
- assessment requirements for each area of the project
- suggestions for project ideas

Developing skills for learning, skills for life and skills for work

You should identify opportunities throughout the course for candidates to develop skills for learning, skills for life and skills for work.

Candidates should be aware of the skills they are developing and you can provide advice on opportunities to practise and improve them.

SQA does not formally assess skills for learning, skills for life and skills for work.

There may also be opportunities to develop additional skills depending on the approach centres use to deliver the course. This is for individual teachers and lecturers to manage.

Some examples of potential opportunities to practise or improve these skills are provided in in the following table.

Skill	How to develop
2 Numeracy	
2.1 Number processes	♦ using meters to measure voltage, current and resistance ♦ setting problem-solving questions applying Ohm's Law to calculate values of resistance, current and voltage ♦ using variables in arithmetic processes as part of control programming ♦ using formulae involving torque ♦ calculating efficiency, work done and power ♦ calculating forces in frames and reaction forces ♦ calculating Young's modulus and factor of safety ♦ applying correct units to results
2.3 Information handling	♦ using Boolean algebra when analysing and designing logic circuits ♦ interpreting information on operating characteristics of electronic components from logarithmic graphs ♦ producing flowcharts and control programs ♦ producing and interpreting truth tables ♦ drawing and interpreting system and sub-system diagrams ♦ interpreting online and other data sources, and using these to design sub-systems ♦ calculating values to produce devices with particular characteristics ♦ studying diagrams of mechanisms (couplings and bearings)

Skill	How to develop
	♦ building pneumatic systems from diagrams ♦ drawing diagrams of structures, mechanisms and pneumatic systems ♦ drawing stress-strain graphs for different materials
3 Health and wellbeing	
3.1 Personal learning	♦ working autonomously, taking responsibility for planning and completing the project within the time available ♦ taking opportunities to follow up on curiosity, thinking constructively and learning from experience
4 Employability, enterprise and citizenship	
4.2 Information and communication technology (ICT)	♦ using circuit simulation software ♦ programming microcontroller systems ♦ storing evidence (notes, reports and diagrams) in digital format ♦ researching engineering applications using online resources ♦ preparing, delivering and reflecting on a presentation of research findings ♦ using simulation packages ♦ researching mechanisms using online resources
5 Thinking skills	
5.3 Applying	♦ carrying out practical problem solving in designing analogue, digital, and programmed control systems ♦ applying electronic control concepts to real examples and situations ♦ using knowledge previously gained to design sub-systems which will function in a predetermined way ♦ testing, reflecting on and modifying sub-systems to perform in the desired way ♦ applying knowledge of structures, pneumatics and drive systems to solve practical problems ♦ using calculated results when designing systems
5.4 Analysing and evaluating	♦ testing and evaluating analogue, digital, and programmed control systems ♦ identifying key aspects of a problem ♦ evaluating mechanical and pneumatic solutions against a specification ♦ choosing mechanical or pneumatic devices to solve a problem

Administrative information

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History of changes

Version	Description of change	Date
2.0	Course support notes added as appendix. Skills, knowledge and understanding for the course assessment' section: 'product' amended to 'project' in the 'Engineering project management' area bullet point changed to a second-order bullet point in the 'Electronics and control' area	September 2019

Note: please check SQA's website to ensure you are using the most up-to-date version of this document.