

ST0024/V1.2

## Draft end-point assessment plan for the Electrical and electronic engineer (degree) apprenticeship

Apprenticeship reference number	Level of this end-point assessment (EPA)	Integration
ST0024	6	Degree-apprenticeship

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## Introduction and overview

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This document explains the requirements for end-point assessment (EPA) for the electrical and electronic engineer (degree) degree-apprenticeship. End-point assessment organisations (EPAOs) must follow this when designing and delivering the EPA.

Electrical and electronic engineer (degree) apprentices, their employers and training provider should read this document.

A degree-apprenticeship awards a degree with the achievement of the apprenticeship. The degree learning outcomes must be aligned with the knowledge, skills and behaviours (KSBs) in the apprenticeship. The degree must be completed, passed and awarded alongside the electrical and electronic engineer (degree) degree-apprenticeship.

The apprentice must complete their training and meet the gateway requirements before starting their EPA. The EPA will assess occupational competence.

A degree-apprenticeship must be delivered by a Higher Education Provider (HEP) that is on the apprenticeship providers and assessment register (APAR). The selected HEP must be the training provider and the EPAO. The apprentice's employer must select a HEP from this register.

If the HEP is using a credit framework, the EPA must contribute to the total credit value, and must be delivered in line with this EPA plan. However, the number of credits devoted to EPA may vary across HEP's. The recommended EPA contribution is 10% of the total credit value.

A full-time electrical and electronic engineer (degree) apprentice typically spends 42 months on-programme. The apprentice must spend at least 12 months on-programme and complete the required amount of off-the-job training in line with the apprenticeship funding rules.

This EPA should be completed within an EPA period lasting typically 6 months.

Occupational competence is outlined by the EPA grade descriptors and determined, when assessed in line with this EPA plan, by an independent assessor who is an occupational expert and confirms the overall EPA grade.

This EPA has 2 assessment methods.

Assessment method 1 - project with report, presentation and questioning:

- fail

- pass

Assessment method 2 - professional discussion underpinned by a portfolio of evidence:

- fail
- pass
- distinction

The result from each assessment method is combined to decide the overall degree-apprenticeship grade. The following grades are available for the degree-apprenticeship:

- fail
- pass
- distinction

**EPA summary table**

[Edit epa gateway form](#)[Edit available grades form](#)[Edit overall epa grading form](#)[Edit re-sits and re-takes form](#)

<p><b>On-programme - typically 42 months</b></p>	<p>The apprentice must:</p> <ul style="list-style-type: none"> <li>• complete training to develop the knowledge, skills and behaviours (KSBs) outlined in this degree-apprenticeship’s standard</li> <li>• complete training towards English and mathematics qualifications in line with the apprenticeship funding rules</li> <li>• compile a portfolio of evidence</li> <li>• work towards all required elements of the electrical and electronic engineer (degree) degree-apprenticeship except undertaking the EPA.</li> </ul> <p>The qualification required is:</p> <p>BEng or BSc Honours Electrical and Electronic Engineer degree that fully aligns with the KSBs</p>
<p><b>End-point assessment gateway</b></p>	<p>The apprentice’s employer must be content that the apprentice is occupationally competent.</p> <p>The apprentice must:</p>

	<ul style="list-style-type: none"> <li>• confirm they are ready to take the EPA</li> <li>• have achieved English and mathematics qualifications in line with the apprenticeship funding rules</li> <li>• have completed and passed all required elements of the electrical and electronic engineer (degree) degree-apprenticeship except the EPA</li> </ul> <p>For the project with report, presentation and questioning, the apprentice must submit a project brief. To ensure the project allows the apprentice to meet the KSBs mapped to this assessment method to the highest available grade, the EPAO should sign-off the project's title and scope at the gateway to confirm it is suitable. A brief project summary must be submitted to the EPAO. It should be no more than 500 words. This needs to show that the project will provide the opportunity for the apprentice to cover the KSBs mapped to this assessment method. It is not assessed.</p> <p>For the professional discussion underpinned by a portfolio of evidence, the apprentice must submit a portfolio of evidence.</p> <p>Gateway evidence must be submitted to the EPAO, along with any organisation specific policies and procedures requested by the EPAO.</p>
<p><b>End-point assessment - typically 6 months</b></p>	<p><b>The grades available for each assessment method are below</b></p> <p>Project with report, presentation and questioning:</p> <ul style="list-style-type: none"> <li>• fail</li> <li>• pass</li> </ul> <p>Professional discussion underpinned by a portfolio of evidence:</p> <ul style="list-style-type: none"> <li>• fail</li> <li>• pass</li> <li>• distinction</li> </ul> <p><b>Overall EPA and degree-apprenticeship can be graded:</b></p> <ul style="list-style-type: none"> <li>○ fail</li> <li>○ pass</li> </ul>

	<ul style="list-style-type: none"> <li>○ distinction</li> </ul>
<b>Professional recognition</b>	<p>This degree-apprenticeship aligns with:</p> <ul style="list-style-type: none"> <li>• Institute of Engineering and Technology (IET) for Incorporated Engineer (IEng)</li> </ul>
<b>Re-sits and re-takes</b>	<p>The details for re-sits and re-takes are below:</p> <ul style="list-style-type: none"> <li>• re-take and re-sit grade cap: pass</li> <li>• re-sit timeframe: typically 3 months</li> <li>• re-take timeframe: typically 6 months</li> </ul>

### **Duration of end-point assessment period**

[Edit duration of end-point assessment period form](#)

The EPA is taken in the EPA period. The EPA period starts when the EPAO confirms the gateway requirements have been met and is typically 6 months.

The EPAO should confirm the gateway requirements have been met and start the EPA as quickly as possible.

### **EPA gateway**

[Edit epa gateway form](#)

The apprentice's employer must be content that the apprentice is occupationally competent. That is, they are deemed to be working at or above the level set out in the apprenticeship standard and ready to undertake the EPA. The employer may take advice from the apprentice's training provider, but the employer must make the decision. The apprentice will then enter the gateway.

The apprentice must meet the gateway requirements before starting their EPA.

They must:

- confirm they are ready to take the EPA
- have achieved English and mathematics qualifications in line with the apprenticeship funding rules
- have completed and passed all required elements of the BEng or BSc Honours Electrical and Electronic Engineer degree that fully aligns with the KSBs degree-apprenticeship except the EPA
- submit a project brief for the project with report, presentation and questioning

- submit a portfolio of evidence for the professional discussion underpinned by a portfolio of evidence

### **Portfolio of evidence requirements:**

The apprentice must compile a portfolio of evidence during the on-programme period of the apprenticeship. It should only contain evidence related to the KSBs that will be assessed by the professional discussion. It will typically contain 8 discrete pieces of evidence. Evidence must be mapped against the KSBs. Evidence may be used to demonstrate more than one KSB; a qualitative as opposed to quantitative approach is suggested.

Evidence sources may include workplace documentation and records, for example:

- workplace policies and procedures
- witness statements
- annotated photographs
- video clips with a maximum total duration 10 minutes; the apprentice must be in view and identifiable

This is not a definitive list; other evidence sources can be included.

The portfolio of evidence should not include reflective accounts or any methods of self-assessment. Any employer contributions should focus on direct observation of performance, for example, witness statements, rather than opinions. The evidence provided should be valid and attributable to the apprentice; the portfolio of evidence should contain a statement from the employer and apprentice confirming this.

The EPAO should not assess the portfolio of evidence directly as it underpins the discussion. The independent assessor should review the portfolio of evidence to prepare questions for the discussion. They are not required to provide feedback after this review.

Gateway evidence must be submitted to the EPAO, along with any organisation specific policies and procedures requested by the EPAO.

### **Order of assessment methods**

[Edit order of assessment methods form](#)

The assessment methods can be delivered in any order. The result of one assessment method does not need to be known before starting the next.

### **Project with report, presentation and questioning**

[Edit project with report, presentation and questioning form](#)

## **Overview**

The project assessment method involves the apprentice completing a significant and defined piece of work that has a real business application and benefit. This process may include for example, research, analysis and the completion of tasks or activities to achieve the outcome. The assessment method will have an output at the end of the defined piece of work. The work completed for the project assessment method must meet the needs of the employer's business and be relevant to the apprentice's occupation and apprenticeship.

This assessment method has 2 components:

- completion of the defined piece of work for the project with a project output
- completion of the defined piece of work for the presentation with questions and answers

Together, these components give the apprentice the opportunity to demonstrate the KSBs mapped to this assessment method. They are assessed by an independent assessor.

## **Rationale**

This assessment method is being used because:

- it allows for the assessment of KSBs that take place over a long period of time
- it allows for a broad set of KSBs to be evidenced during the post-gateway period
- it assesses KSBs holistically
- it can produce something that is of genuine business benefit to the apprentice's employer

## **Delivery**

The apprentice must complete a project based on any of the following:

- a specific problem or recurring issue related to a product, or a research or development project, for example a continuous improvement project or product system update
- a new project such as the implementation of a product or technology (depending on size this may only cover a certain aspect of the project)
- a feasibility study such as investigating a new piece of equipment or technology

To ensure the project allows the apprentice to meet the KSBs mapped to this assessment method to the highest available grade, the EPAO must sign-off the project's

title and scope at the gateway to confirm it is suitable. The EPAO must refer to the grading descriptors to ensure that projects are pitched appropriately.

The project output must be in the form of a report and presentation.

The apprentice must start the project after the gateway. The employer should ensure the apprentice has the time and resources, within the project period, to plan and complete their project.

The apprentice may work as part of a team to complete the project, which could include internal colleagues or technical experts. The apprentice must however, complete their project report and presentation unaided and they must be reflective of their own role and contribution. The apprentice and their employer must confirm this when the report and any presentation materials are submitted.

### **Component 1: Project report**

The report must include at least:

- an executive summary (or abstract)
- an introduction
- the scope of the project (including key performance indicators, aims and objectives)
- a project plan
- research outcomes
- data analysis outcomes
- project outcomes
- discussion of findings
- recommendations and conclusions
- references
- appendix containing mapping of KSBs to the report.

The project report must have a word count of 9000 words. A tolerance of 10% above or below is allowed at the apprentice's discretion. Appendices, references and diagrams are not included in this total. The apprentice must produce and include a mapping in an appendix, showing how the report evidences the KSBs mapped to this assessment method.

The apprentice must complete and submit the report and any presentation materials to the EPAO by the end of week 20 of the EPA period.



## **Component 2: Presentation with questions**

The presentation with questions must be structured to give the apprentice the opportunity to demonstrate the KSBs mapped to this assessment method to the highest available grade.

The apprentice must prepare and deliver a presentation to an independent assessor. After the presentation, the independent assessor must ask the apprentice questions about their project, report and presentation.

The presentation should cover:

- an overview of the project
- the project scope (including key performance indicators)
- summary of actions undertaken by the apprentice
- project outcomes and how these were achieved

The presentation with questions must last 60 minutes. This will typically include a presentation of 20 minutes and questioning lasting 40 minutes. The independent assessor must use the full time available for questioning. The independent assessor can increase the time of the presentation and questioning by up to 10%. This time is to allow the apprentice to complete their last point or respond to a question if necessary.

The independent assessor must ask at least 5 questions. They must use the questions from the EPAO's question bank or create their own questions in line with the EPAO's training. Follow up questions are allowed where clarification is required.

The purpose of the independent assessor's questions is:

- to verify that the activity was completed by the apprentice
- to seek clarification where required
- to assess those KSBs that the apprentice did not have the opportunity to demonstrate with the report, although these should be kept to a minimum
- to assess level of competence against the grading descriptors

The apprentice must submit any presentation materials to the EPAO at the same time as the report - by the end of week 20 of the EPA period. The apprentice must notify the EPAO, at that point, of any technical requirements for the presentation.

During the presentation, the apprentice must have access to:

- audio-visual presentation equipment
- flip chart and writing and drawing materials

- computer

The independent assessor must have at least 2 weeks to review the project report and any presentation materials, to allow them to prepare questions.

The apprentice must be given at least 2 days' notice of the presentation with questions.

The apprentice may choose to end the presentation early. The apprentice must be confident they have demonstrated competence against the assessment requirements for the assessment method. The independent assessor or EPAO must ensure the apprentice is fully aware of all assessment requirements. The independent assessor or EPAO cannot suggest or choose to end the assessment methods early, unless in an emergency. The EPAO is responsible for ensuring the apprentice understands the implications of ending an assessment early if they choose to do so. The independent assessor may suggest the assessment continues. The independent assessor must document the apprentice's request to end the assessment early.

### **Assessment decision**

The independent assessor must make the grading decision. They must assess the project components holistically when deciding the grade.

The independent assessor must keep accurate records of the assessment. They must record:

- the KSBs demonstrated in the report and presentation with questions
- the apprentice's answers to questions
- the grade achieved

### **Assessment location**

The presentation with questions must take place in a suitable venue selected by the EPAO for example, the EPAO's or employer's premises. It should take place in a quiet room, free from distractions and influence.

The presentation with questions can be conducted by video conferencing. The EPAO must have processes in place to verify the identity of the apprentice and ensure the apprentice is not being aided.

### **Question and resource development**

The EPAO must develop a purpose-built assessment specification and question bank. It is recommended this is done in consultation with employers of this occupation. The EPAO must maintain the security and confidentiality of EPA materials when consulting with employers. The assessment specification and question bank must be reviewed at least once a year to ensure they remain fit-for-purpose.

The assessment specification must be relevant to the occupation and demonstrate how to assess the KSBs mapped to this assessment method. The EPAO must ensure that questions are refined and developed to a high standard. The questions must be unpredictable. A question bank of sufficient size will support this.

The EPAO must ensure that the apprentice has a different set of questions in the case of re-sits or re-takes.

EPAO must produce the following materials to support the project:

- independent assessor EPA materials which include:
  - training materials
  - administration materials
  - moderation and standardisation materials
  - guidance materials
  - grading guidance
  - question bank
- EPA guidance for the apprentice and the employer

The EPAO must ensure that the EPA materials are subject to quality assurance procedures including standardisation and moderation.

### **Professional discussion underpinned by a portfolio of evidence**

[Edit professional discussion underpinned by a portfolio of evidence form](#)

#### **Overview**

In the professional discussion, an independent assessor and apprentice have a formal two-way conversation. It gives the apprentice the opportunity to demonstrate the KSBs mapped to this assessment method.

#### **Rationale**

This assessment method is being used because:

- it assesses KSBs holistically and objectively
- it allows for the assessment of KSBs that do not occur on a predictable or regular basis
- it allows for assessment of responses where there are a range of potential answers
- it can be conducted remotely, potentially reducing cost

## **Delivery**

The professional discussion must be structured to give the apprentice the opportunity to demonstrate the KSBs mapped to this assessment method to the highest available grade.

An independent assessor must conduct and assess the professional discussion.

The purpose of the independent assessor's questions will be to assess the apprentice's competence against the following themes:

- electrical and electronic activities
- problem solving and improvement
- values and professional behaviours

The EPAO must give an apprentice 2 weeks' notice of the professional discussion.

The independent assessor must have at least 2 weeks to review the supporting documentation.

The apprentice must have access to their portfolio of evidence during the professional discussion.

The apprentice can refer to and illustrate their answers with evidence from their portfolio of evidence however, the portfolio of evidence is not directly assessed.

The professional discussion must last for 60 minutes. The independent assessor can increase the time of the professional discussion by up to 10%. This time is to allow the apprentice to respond to a question if necessary.

The independent assessor must explain to the apprentice the format and timescales of the professional discussion before it starts. This does not count towards the assessment time.

The independent assessor must ask at least 5 questions. The independent assessor must use the questions from the EPAO's question bank or create their own questions in line with the EPAO's training. Follow-up questions are allowed where clarification is required.

The apprentice may choose to end the assessment method early. The apprentice must be confident they have demonstrated competence against the assessment requirements for the assessment method. The independent assessor or EPAO must ensure the apprentice is fully aware of all assessment requirements. The independent assessor or EPAO cannot suggest or choose to end the assessment methods early, unless in an emergency. The EPAO is responsible for ensuring the apprentice understands the implications of ending an assessment early if they choose to do so. The

independent assessor may suggest the assessment continues. The independent assessor must document the apprentice's request to end the assessment early.

The independent assessor must make the grading decision.

The independent assessor must keep accurate records of the assessment. They must record:

- the apprentice's answers to questions
- the KSBs demonstrated in answers to questions
- the grade achieved

### **Assessment location**

The professional discussion must take place in a suitable venue selected by the EPAO for example, the EPAO's or employer's premises.

The professional discussion can be conducted by video conferencing. The EPAO must have processes in place to verify the identity of the apprentice and ensure the apprentice is not being aided.

The professional discussion should take place in a quiet room, free from distractions and influence.

### **Question and resource development**

The EPAO must develop a purpose-built assessment specification and question bank. It is recommended this is done in consultation with employers of this occupation. The EPAO must maintain the security and confidentiality of EPA materials when consulting with employers. The assessment specification and question bank must be reviewed at least once a year to ensure they remain fit-for-purpose.

The assessment specification must be relevant to the occupation and demonstrate how to assess the KSBs mapped to this assessment method. The EPAO must ensure that questions are refined and developed to a high standard. The questions must be unpredictable. A question bank of sufficient size will support this.

The EPAO must ensure that the apprentice has a different set of questions in the case of re-sits or re-takes.

The EPAO must produce the following materials to support the professional discussion underpinned by a portfolio of evidence:

- independent assessor assessment materials which include:
  - training materials
  - administration materials

- moderation and standardisation materials
- guidance materials
- grading guidance
- question bank
- EPA guidance for the apprentice and the employer

The EPAO must ensure that the EPA materials are subject to quality assurance procedures including standardisation and moderation.

### Grading

[Edit add grade descriptor form](#)[Edit mapping of ksbs to grade themes form](#)[Edit available grades form](#)

### Project with report, presentation and questioning

Fail - does not meet pass criteria

Theme KSBs	Pass Apprentices must demonstrate all of the pass descriptors
Project delivery K3 K4 K6 K7 K8 K15 K16 K17 K22 K24 K27 S1 S3 S4 S5 S9 S13 S15 S19 S23	<p>Uses scientific and engineering principles to observe, record and draw accurate and auditable conclusions from data evidence, including data derived from simulation software. (K6, K17, S5)</p> <p>Uses mechanical principles and applications to ensure components or systems will function safely, reliably and efficiently to support the project brief. (K3, S23)</p> <p>Collates, stores, uses and presents data and supporting documentation to support the project and its' progress. (K8, S3)</p> <p>Manages project documentation, creating, maintaining, reviewing and analysing documentation to support the project needs and in line with company procedures. (K27, S13)</p>

<b>Theme</b> <b>KSBs</b>	<b>Pass</b> <b>Apprentices must demonstrate all of the pass descriptors</b>
	<p>Analyses conceptual ideas or technical requirements, and selects materials, resources, equipment, components, processes, methods and technologies which enable the successful translation of those ideas or requirements into a developmental outcome, operational design, or specification for system or components (K4, K22, S1, S9)</p> <p>Interprets and produces technical documentation including CAD models, to achieve the project brief. (K7, K16, S4)</p> <p>Uses written communication techniques suitable for the context, adapting style, format and terminology to suit audience. (K24, S15)</p> <p>Considers and includes management of change requirements in order to meet the project brief. (K15, S19)</p>
<p>Safety and sustainability K1 K2 K26 S8 S20 B1 B7</p>	<p>Promotes a healthy and safe working environment by complying with safe systems of work, and embedding safety and security legislation, regulations and standards into working practices. (K1, K2, S8, B1)</p> <p>Complies with environmental and sustainability legislation, regulations and standards, leading by example by embedding sustainable approaches in their response to the project brief. (K26, S20, B7)</p>

<b>Theme</b> <b>KSBs</b>	<b>Pass</b> <b>Apprentices must demonstrate all of the pass descriptors</b>
Leadership and management K9 K18 S6 S7	Manages the project, taking into account factors such as planning, safety, quality, cost, performance and sustainability as required. Applies processes such as escalation, risk management and mitigation as appropriate to ensure the project is delivered on time and to the agreed project brief. (K9, K18, S6, S7)

**Professional discussion underpinned by a portfolio of evidence**

Fail - does not meet pass criteria

<b>Theme</b> <b>KSBs</b>	<b>Pass</b> <b>Apprentices must demonstrate all of the pass descriptors</b>	<b>Distinction</b> <b>Apprentices must demonstrate all of the pass descriptors and all of the distinction descriptors</b>
Electrical and electronic activities K20 K28 K29 K30 S1 1 S21	Explains how they carry out pre-operational checks to electrical and electronic engineering systems and equipment in line with organisational and manufacturer's guidelines. (K28, S11)  Explains how they ensure equipment is managed and maintained in line with	Analyses the importance and benefits to the organisation of developing and complying with maintenance strategies. (S21)



<b>Theme</b> <b>KSBs</b>	<b>Pass</b> <b>Apprentices must demonstrate all of the pass descriptors</b>	<b>Distinction</b> <b>Apprentices must demonstrate all of the pass descriptors and all of the distinction descriptors</b>
	<p>organisational processes and procedures. (S21)</p> <p>Explains the principles of control and instrumentation in an electrical and electronic engineering environment. (K20)</p> <p>Explains the principles of digital and embedded systems and software development and testing in an electrical and electronic engineering environment. (K29, K30)</p>	
<p>Problem solving and improvement K10 K11 K13 K14 S2 S10 S12 S22 B2 B3</p>	<p>Describes how they selected and applied problem-solving methods that met the needs of a project, and how they were agile and resilient in dealing with these situations as they arose. (K11, S2, B3)</p> <p>Explains how they manage continuous improvement activities to electrical or electronic products, systems or components in</p>	<p>Justifies their approach to problem-solving and critically evaluates its effectiveness. (K11, S2)</p>

<b>Theme</b> <b>KSBs</b>	<b>Pass</b> <b>Apprentices must demonstrate all of the pass descriptors</b>	<b>Distinction</b> <b>Apprentices must demonstrate all of the pass descriptors and all of the distinction descriptors</b>
	<p>line with organisational procedures. (K10, S12)</p> <p>Explains how they optimise safety, efficiency, performance, productivity and sustainability of processes or procedures. (K13, S22)</p> <p>Explains how they take responsibility for the compliance and quality of work, and enable others to meet these standards, through applying quality management and assurance processes during the electrical or electronic engineering process. (K14, S10, B2)</p>	
Values and professional behaviours K5 K12 K19 K21 K23 K25 S14 S16 S17 S18 B4 B5 B6	Explains how they communicate with others verbally in an electrical and electronic engineering environment, how they match style to audience and overcome barriers to support relationships and deliver outcomes using	Evaluates their approach to CPD and explains how they keep up to date with emerging technologies. (K19, S17)

<b>Theme</b> <b>KSBs</b>	<b>Pass</b> <b>Apprentices must demonstrate all of the pass descriptors</b>	<b>Distinction</b> <b>Apprentices must demonstrate all of the pass descriptors and all of the distinction descriptors</b>
	<p>correct engineering terminology. (K5, S14)</p> <p>Explains how they apply and promote policies and practices to support equity, diversity and inclusion and how they support the needs and concerns of others. (K25, S18, B4)</p> <p>Explains how they identify and complete opportunities for personal and professional development, including in emerging technologies, and explains how they support the development of others in line with organisational procedures. (K12, K19, S17, B5)</p> <p>Explains how they have led teams, collaborated with colleagues and stakeholders and how they strategically manage differing and competing interests with others whilst acting in an ethical and professional manner. (K21, K23, S16, B6)</p>	

## Overall EPA grading

[Edit overall epa grading form](#)

Performance in the EPA determines the overall grade of:

- fail
- pass
- distinction

An independent assessor must individually grade the project with report, presentation and questioning and professional discussion underpinned by a portfolio of evidence in line with this EPA plan.

An independent assessor must individually grade the

- Project with report, presentation and questioning An independent assessor must individually grade the
  - Professional discussion underpinned by a portfolio of evidence

The EPAO must combine the individual assessment method grades to determine the overall EPA grade.

If the apprentice fails one assessment method or more, they will be awarded an overall fail.

To achieve an overall pass, the apprentice must achieve at least a pass in all the assessment methods. To achieve an overall distinction, the apprentice must achieve at least a pass in the project with report, presentation and questioning, and a distinction in the professional discussion underpinned by a portfolio of evidence.

Grades from individual assessment methods must be combined in the following way to determine the grade of the EPA overall.

<b>Project with report, presentation and questioning</b>	<b>Professional discussion underpinned by a portfolio of evidence</b>	<b>Overall Grading</b>
Any grade	Fail	Fail
Fail	Any grade	Fail
Pass	Pass	Pass
Pass	Distinction	Distinction

**EPA degree apprenticeship aggregation**

### [Edit epa degree apprenticeship aggregation form](#)

The outcome of the EPA must be aggregated with the degree to enable the degree-apprenticeship to be awarded.

Once the overall EPA grade has been determined, aggregation can be achieved in a variety of ways. This will be determined during the creation of the degree-apprenticeship. Examples of how this aggregation can work include:

- each assessment method grade, and therefore the overall EPA grade, can be converted to marks or percentages however these must be an absolute figure and not a range
- alternatively, the overall EPA grade can be used directly

HEPs can explore other ways of aggregating the EPA with the degree outcomes in line with the latest IfATE degree-apprenticeship policy

### **Re-sits and re-takes**

#### [Edit re-sits and re-takes form](#)

If the apprentice fails one assessment method or more, they can take a re-sit or a re-take at their employer's discretion. The apprentice's employer needs to agree that a re-sit or re-take is appropriate. A re-sit does not need further learning, whereas a re-take does. The apprentice should have a supportive action plan to prepare for a re-sit or a re-take.

The employer and the EPAO should agree the timescale for a re-sit or re-take. A re-sit is typically taken within 3 months of the EPA outcome notification. The timescale for a re-take is dependent on how much re-training is required and is typically taken within 6 months of the EPA outcome notification.

If the apprentice fails the project assessment method, they must amend the project output in line with the independent assessor's feedback. The apprentice will be given 12 weeks to rework and submit the amended report.

Failed assessment methods must be re-sat or re-taken within a 6-month period from the EPA outcome notification, otherwise the entire EPA will need to be re-sat or re-taken in full.

Re-sits and re-takes are not offered to an apprentice wishing to move from pass to a higher grade.

The apprentice will get a maximum EPA grade of pass if they need to re-sit or re-take one or more assessment methods, unless the EPAO determines there are exceptional circumstances.

## Roles and responsibilities

[Edit roles and responsibilities form](#)

Roles	Responsibilities
Apprentice	<p>As a minimum, the apprentice should:</p> <ul style="list-style-type: none"><li>• complete on-programme training to meet the KSBs as outlined in the apprenticeship standard for a minimum of 12 months</li><li>• complete the required amount of off-the-job training specified by the apprenticeship funding rules as arranged by the employer and training provider</li><li>• understand the purpose and importance of EPA</li><li>• prepare for and undertake the EPA including meeting all gateway requirements</li><li>• ensure that all supporting evidence required at the gateway is submitted in accordance with this EPA plan</li></ul>
Employer	<p>As a minimum, the apprentice's employer must:</p> <ul style="list-style-type: none"><li>• select the EPAO (and therefore training provider)</li><li>• work with the training provider (where applicable) to support the apprentice in the workplace and to provide the opportunities for the apprentice to develop the KSBs</li><li>• arrange and support off-the-job training to be undertaken by the apprentice</li><li>• decide when the apprentice is working at or above the the occupational competence and is ready for EPA</li><li>• ensure the apprentice is prepared for the EPA</li><li>• ensure that all supporting evidence required at the gateway is submitted in accordance with this EPA plan</li><li>• confirm arrangements with the EPAO for the EPA (who, when, where) in a timely manner</li></ul>

Roles	Responsibilities
	<ul style="list-style-type: none"> <li>• provide access to any employer-specific documentation as required, for example company policies)</li> <li>• ensure that the EPA is scheduled with the EPAO for a date and time which allows appropriate opportunity for the apprentice to meet the KSBs.</li> <li>• ensure the apprentice is given sufficient time away from regular duties to prepare for, and complete the EPA</li> <li>• ensure that any required supervision during the EPA period, as stated within this EPA plan, is in place</li> <li>• ensure the apprentice has access to the resources used to fulfil their role and carry out the EPA for workplace based assessments</li> <li>• remain independent from the delivery of the EPA</li> <li>• pass the certificate to the apprentice upon receipt from the EPAO</li> </ul>
EPAO - HEP	<p>As a minimum, the EPAO (HEP) must:</p> <ul style="list-style-type: none"> <li>• conform to the requirements of the register of end-point assessment organisations (RoEPAO)</li> <li>• conform to the requirements of this EPA plan and deliver its requirements in a timely manner</li> <li>• conform to the requirements of the external quality assurance provider (EQAP)</li> <li>• understand the degree-apprenticeship, including the apprenticeship standard, EPA plan and funding</li> <li>• make all necessary contractual arrangements, including agreeing the price of the EPA</li> <li>• develop and produce assessment materials including specifications and marking materials (for example mark schemes, practice materials, training material)</li> </ul>

Roles	Responsibilities
	<ul style="list-style-type: none"> <li>• maintain and apply a policy for the declaration and management of conflict of interests and independence which ensures, as a minimum, no personal benefit or detriment is received by those delivering the EPA or from the result of an assessment and covers: <ul style="list-style-type: none"> <li>○ apprentices</li> <li>○ employers</li> <li>○ assessors</li> <li>○ the HEP's role as a training provider</li> <li>○ any other roles involved in delivery or grading of the EPA</li> </ul> </li> <li>• have quality assurance systems and procedures that ensure fair, reliable and consistent assessment and maintain records of IQA activity for external quality assurance (EQA) purposes</li> <li>• appoint independent, competent and suitably qualified assessors in line with the requirements of this EPA plan</li> <li>• where required to facilitate the EPA, appoint administrators, invigilators and any other roles</li> <li>• deliver induction, initial and on-going training for all assessors, and if used administrators and invigilators and any other roles involved in delivery or grading of the EPA specified within this EPA plan. This should include how to record the rationale and evidence for grading decisions where required</li> <li>• standardise all assessors, before allowing them to deliver EPAs and: <ul style="list-style-type: none"> <li>○ when the EPA is updated</li> <li>○ at least once a year</li> <li>○ moderate their decisions once EPAs have begun</li> </ul> </li> </ul>



Roles	Responsibilities
	<ul style="list-style-type: none"> <li>• develop and produce assessment materials including specifications and marking materials (for example mark schemes, practice materials, training material)</li> <li>• maintain and apply a policy for the declaration and management of conflict of interests and independence which ensures, as a minimum, no personal benefit or detriment is received by those delivering the EPA or from the result of an assessment and covers:</li> <li>• monitor the performance of all assessors and provide re-training where necessary</li> <li>• develop and provide assessment recording documentation to ensure a clear and auditable process is in place for providing assessment decisions and feedback to all relevant stakeholders</li> <li>• use language in the development and delivery of the EPA that is appropriate to the level of the degree-apprenticeship</li> <li>• arrange for the EPA to take place in a timely manner, in consultation with the employer</li> <li>• provide information, advice and guidance documentation to enable apprentices, employers and training providers to prepare for the EPA</li> <li>• confirm all gateway requirements have been met</li> <li>• host and facilitate the EPA or make suitable alternative arrangements</li> <li>• maintain the security of the EPA including, but not limited to, verifying the identity of the apprentice, invigilation, security of materials</li> <li>• where the EPA plan permits assessment away from the workplace, ensure that the apprentice has access to the required resources and liaise with the employer to agree this if necessary</li> <li>• confirm the overall EPA grade</li> </ul>

Roles	Responsibilities
	<ul style="list-style-type: none"> <li>• arrange the certification of the degree-apprenticeship</li> <li>• conduct appeals where required, according to the EPAO's appeals procedure</li> </ul>
Training provider - HEP	<p>As a minimum, the training provider (HEP) must:</p> <ul style="list-style-type: none"> <li>• conform to the requirements of the register of apprenticeship training providers (RoATP)</li> <li>• ensure procedures are in place to mitigate against any conflict of interest</li> <li>• work with the employer and support the apprentice during the off-the-job training to provide the opportunities to develop the knowledge, skills and behaviours as outlined in the apprenticeship standard</li> <li>• deliver training to apprentices as outlined in their learner agreement</li> <li>• monitor the apprentice's progress during any training provider led on-programme learning</li> <li>• ensure the apprentice is prepared for the EPA</li> <li>• advise the employer, upon request, on the apprentice's readiness for EPA</li> <li>• ensure that all supporting evidence required at the gateway is submitted in accordance with this EPA plan</li> </ul>
Independent assessor	<p>As a minimum, an independent assessor must:</p> <ul style="list-style-type: none"> <li>• be independent, with no conflict of interest with the apprentice, their employer or training provider, specifically, they must not receive a personal benefit or detriment from the result of the assessment</li> <li>• not be employed by the same organisation as the apprentice or drawn from an organisation on IfATE's directory of professional and employer-led bodies that supports external quality assurance.</li> </ul>

Roles	Responsibilities
	<ul style="list-style-type: none"> <li>• be current and active in the occupation, for example be sourced from the industry or a professional body</li> <li>• have, maintain and be able to evidence up-to-date knowledge and expertise of the occupation</li> <li>• have authority to represent the professional body where the EPA is acting as the professional body's assessment process (if necessary and permitted in the EPA plan)</li> <li>• have the competence to assess the EPA and meet the requirements of the IQA section of this EPA plan</li> <li>• understand the degree-apprenticeship (occupational standard and EPA plan)</li> <li>• attend induction and standardisation events before they conduct an EPA for the first time, when the EPA is updated, and at least once a year</li> <li>• use language in the delivery of the EPA that is appropriate to the level of the degree-apprenticeship</li> <li>• work with other personnel, including additional assessors where used, in the preparation and delivery of assessment methods</li> <li>• conduct the EPA to assess the apprentice against the KSBs and in accordance with the EPA plan</li> <li>• make all final grading decisions on an apprentice's occupational competence in accordance with grading descriptors in this EPA plan</li> <li>• if an assessor panel is used, the independent assessor must chair and make final grading decisions</li> <li>• record and report all assessment outcome decisions for each apprentice</li> <li>• comply with the IQA requirements of the EPAO</li> <li>• comply with external quality assurance (EQA) requirements</li> </ul>

Roles	Responsibilities
External examiner	<p>As a minimum, the external examiner must:</p> <ul style="list-style-type: none"> <li>• confirm the EPA has been delivered in accordance with the EPA plan</li> <li>• accept, and therefore not change, the EPA grading decisions made by the independent assessor</li> <li>• comply with the requirements of the EPA plan and IfATE policies</li> <li>• comply with the requirements, policies, and procedures of the EQA provider</li> <li>• be independent of the apprentice, and the employing organisation who are involved in delivering the degree-apprenticeship</li> <li>• be independent of the delivery and awarding of the EPA</li> <li>• not have been involved in the teaching or on-programme assessment of the apprentice</li> </ul>

### Reasonable adjustments

[Edit reasonable adjustments form](#)

### Reasonable adjustments

The EPAO must have reasonable adjustments arrangements for the EPA.

This should include:

- how an apprentice qualifies for a reasonable adjustment
- what reasonable adjustments may be made

Adjustments must maintain the validity, reliability and integrity of the EPA as outlined in this EPA plan.

### Special considerations

The EPAO must have special consideration arrangements for the EPA.

This should include:

- how an apprentice qualifies for a special consideration
- what special considerations will be given

Special considerations must maintain the validity, reliability and integrity of the EPA as outlined in this EPA plan.

### **Internal quality assurance**

[Edit internal quality assurance form](#)

They must also appoint independent assessors who:

- have recent relevant experience of the occupation or sector to at least occupational level 6 gained in the last 3 years or significant experience of the occupation or sector
- meet the following minimum requirements:
  - will typically have professional recognition at incorporated engineer level or above by a professional body recognised by the engineering council.

### **Value for money**

[Edit value for money form](#)

Affordability of the EPA will be aided by using at least some of the following:

- utilising digital remote platforms to conduct applicable assessment methods
- using the employer's premises
- conducting assessment methods on the same day

### **Professional recognition**

[Edit professional recognition form](#)

This degree-apprenticeship aligns with:

- Institute of Engineering and Technology (IET) for Incorporated Engineer (IEng)

### **Mapping of KSBs to assessment methods**

[Edit mapping of ksbs to assessment methods form](#)

<b>Knowledge</b>	<b>Assessment methods</b>
<b>K1</b> Safety and security legislation, regulations and standards associated with an electrical and electronic engineering environment. Cyber security and statutory safety standards.	Project with report, presentation and questioning

Knowledge	Assessment methods
<p><b>K2</b></p> <p>Hazards, risks and safe systems of work in an electrical and electronic engineering environment including design safety of high voltage systems.</p>	<p>Project with report, presentation and questioning</p>
<p><b>K3</b></p> <p>Principles and applications of mechanics in an electrical and electronic engineering environment: motion, energy and force to ensure that systems and components function safely, efficiently and reliably.</p>	<p>Project with report, presentation and questioning</p>
<p><b>K4</b></p> <p>Factors that determine material, equipment and component selection. For example, quality, efficiency, performance, manpower and layout.</p>	<p>Project with report, presentation and questioning</p>
<p><b>K5</b></p> <p>Verbal communication techniques. Giving and receiving information. Matching style to audience. Barriers in communication and ways to overcome them.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p><b>K6</b></p> <p>Principles of mathematics and scientific methods including analytical techniques. Evaluating statistical data, complex numbers and matrices required in an electrical and electronic engineering environment.</p>	<p>Project with report, presentation and questioning</p>
<p><b>K7</b></p> <p>Electrical and electronic engineering principles used in the design and development of components equipment and systems including electromagnetism, the laws and theorems that govern electronic circuits: function of common digital and analogue electronic devices, passive circuit behaviour, modelling circuits, active electronic components, transformers, AC/DC, power electronics, motors and drives.</p>	<p>Project with report, presentation and questioning</p>

Knowledge	Assessment methods
<p><b>K8</b></p> <p>Data collection, storage, and presentation techniques.</p>	<p>Project with report, presentation and questioning</p>
<p><b>K9</b></p> <p>Project commercials: delays, changes and impacts.</p>	<p>Project with report, presentation and questioning</p>
<p><b>K10</b></p> <p>Techniques used for improving and enhancing electrical and electronic components, equipment and systems: safety, reliability, quality, performance and sustainability.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p><b>K11</b></p> <p>Problem solving tools and techniques for establishing performance characteristics, for example: Define, Measure, Analyse, Improve and Control (DMAIC), Failure Mode Effect Analysis (FMEA), Plan-Do-Check-Act (PDCA), Fishbone diagrams.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p><b>K12</b></p> <p>Workplace training and development techniques: personal and professional development. Coaching and transfer of knowledge.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p><b>K13</b></p> <p>Processes used to optimise safety, efficiency, performance, productivity and sustainability.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p><b>K14</b></p> <p>Quality management and assurance processes.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p><b>K15</b></p> <p>Management of change (MOC) processes: requesting change, determining viability, planning, implementing and evaluating changes to a product, system or component. Use of data to</p>	<p>Project with report, presentation and questioning</p>

Knowledge	Assessment methods
support change. Adherence to MOC, risks and limitations of MOC approval.	
<b>K16</b> Principles of Computer Aided Design (CAD) and the application in an electrical and electronic engineering environment.	Project with report, presentation and questioning
<b>K17</b> Principles and applications of simulation software in an electrical and electronic engineering environment.	Project with report, presentation and questioning
<b>K18</b> Project management techniques for project delivery: planning, cost and budget control, risk, and quality.	Project with report, presentation and questioning
<b>K19</b> Current and emerging technology in an electrical and electronic engineering environment: mechanical and electrical integration, digitalisation, artificial intelligence, Internet of Things, automation, robotics, 3D printing, awareness of cloud computing and cyber security.	Professional discussion underpinned by a portfolio of evidence
<b>K20</b> Control and instrumentation: principles of analogue and digital control systems including transducer systems and operation; measurement applications and error; principles of closed loop control systems, block diagrams.	Professional discussion underpinned by a portfolio of evidence
<b>K21</b> Collaboration working methods with stakeholders: best practice, quality and performance measures, issue resolution.	Professional discussion underpinned by a portfolio of evidence
<b>K22</b>	Project with report, presentation and questioning



Knowledge	Assessment methods
Manufacturing methods, processes and technologies, for example assembling components or sub-systems into finished electrical and electronic equipment or systems.	
<b>K23</b> Teamwork and leadership: negotiation techniques, conflict management and development techniques.	Professional discussion underpinned by a portfolio of evidence
<b>K24</b> Written communication techniques. Plain English principles. Electrical and electronic engineering terminology. Report writing, presentations, data analysis documentation.	Project with report, presentation and questioning
<b>K25</b> Equity, diversity, and inclusion in the workplace. Unconscious bias.	Professional discussion underpinned by a portfolio of evidence
<b>K26</b> Environmental and sustainability legislation, regulations and standards associated with an electrical and electronic engineering environment. Carbon zero, recycling and reusability targets.	Project with report, presentation and questioning
<b>K27</b> Project documentation: ownership, company procedures, selection and appropriate use.	Project with report, presentation and questioning
<b>K28</b> Pre-operation checks required on electrical and electronic systems and components.	Professional discussion underpinned by a portfolio of evidence
<b>K29</b> Digital and embedded system principles including embedded systems and their development, number systems, Boolean algebra, logic gates, logic expressions, combinational logic,	Professional discussion underpinned by a portfolio of evidence

Knowledge	Assessment methods
analogue to digital and digital to analogue converters, computer and microcomputer systems and architectures.	
<p><b>K30</b></p> <p>Principles of software development and testing including coding languages and methodologies used to evaluate and verify the software meets the required specification in an electrical and electronic engineering environment.</p>	Professional discussion underpinned by a portfolio of evidence
Skill	Assessment methods
<p><b>S1</b></p> <p>Translate conceptual ideas or technical requirements into developmental outcomes, operational designs, or specifications for electrical and electronic projects or programmes of work.</p>	Project with report, presentation and questioning
<p><b>S2</b></p> <p>Select, use and apply approved problem-solving methods to solve problems and determine solutions or actions.</p>	Professional discussion underpinned by a portfolio of evidence
<p><b>S3</b></p> <p>Collate, store, use and present data and supporting documentation.</p>	Project with report, presentation and questioning
<p><b>S4</b></p> <p>Interpret and produce technical documentation such as schematic and circuit diagrams, engineering drawings or 3D CAD models, simulation models, engineering reports, test reports, fault reports or data analytics.</p>	Project with report, presentation and questioning
<p><b>S5</b></p> <p>Observe, record and draw accurate and auditable conclusions from data evidence.</p>	Project with report, presentation and questioning

Knowledge	Assessment methods
<p><b>S6</b></p> <p>Manage assigned projects or programmes of work, taking into account factors such as planning, safety, quality, cost, performance and sustainability.</p>	<p>Project with report, presentation and questioning</p>
<p><b>S7</b></p> <p>Apply processes for project or programme management such as escalation, audit or risk management and risk mitigation.</p>	<p>Project with report, presentation and questioning</p>
<p><b>S8</b></p> <p>Comply with statutory and organisational safety and security standards and requirements, supporting safety risk assessments and mitigate any risks identified within the design, manufacture, development or test activity.</p>	<p>Project with report, presentation and questioning</p>
<p><b>S9</b></p> <p>Identify and use processes, resources and technologies to complete electrical and electronic engineering projects or programmes of work.</p>	<p>Project with report, presentation and questioning</p>
<p><b>S10</b></p> <p>Apply quality management and assurance processes to identify and rectify faults, inaccuracies, discrepancies or unexpected results during the electrical and electronic engineering process.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p><b>S11</b></p> <p>Carry out pre operations checks of electrical and electronic engineering systems and equipment before use.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p><b>S12</b></p> <p>Manage continuous improvement activities using techniques such as such as Six Sigma, 5s, Kaizen, Lean, Kanban, Statistical Process Control or Value Stream Mapping.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>

Knowledge	Assessment methods
<p><b>S13</b></p> <p>Create, maintain and review project documentation. Record and action any non-conformities.</p>	<p>Project with report, presentation and questioning</p>
<p><b>S14</b></p> <p>Communicate with others verbally, for example colleagues and stakeholders.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p><b>S15</b></p> <p>Communicate in writing, for example technical reports, documents and presentations.</p>	<p>Project with report, presentation and questioning</p>
<p><b>S16</b></p> <p>Collaborate with colleagues and stakeholders. Manage differing and competing interests with stakeholders.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p><b>S17</b></p> <p>Identify and complete opportunities for personal and professional development including keeping up to date with current and emerging technology.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p><b>S18</b></p> <p>Apply and promote policies and practices to support equity, diversity and inclusion.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p><b>S19</b></p> <p>Consider management of change (MOC) requirements when undertaking manufacturing projects or programmes of work.</p>	<p>Project with report, presentation and questioning</p>
<p><b>S20</b></p> <p>Comply with environmental and sustainability legislation, regulations and standards associated with the manufacturing engineering environment. Uses resources efficiently, for example waste minimisation.</p>	<p>Project with report, presentation and questioning</p>

Knowledge	Assessment methods
<p><b>S21</b></p> <p>Ensure equipment is managed and maintained.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p><b>S22</b></p> <p>Optimise processes and procedures, such as relating to safety, efficiency, performance, productivity and sustainability.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p><b>S23</b></p> <p>Ensure that all systems or equipment has been correctly configured, checked and tested for safe operation, efficiency and reliability.</p>	<p>Project with report, presentation and questioning</p>
Behaviour	Assessment methods
<p><b>B1</b></p> <p>Promotes a healthy and safe working environment.</p>	<p>Project with report, presentation and questioning</p>
<p><b>B2</b></p> <p>Take responsibility for the compliance and quality of work in their area and enable others to meet these standards.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p><b>B3</b></p> <p>Agile and resilient in dealing with new and changing situations.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p><b>B4</b></p> <p>Supportive of the needs and concerns of others, especially where this relates to diversity and inclusion.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p><b>B5</b></p> <p>Committed to maintaining and enhancing competence of self and others through Continued Professional Development (CPD).</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>

Behaviour	Assessment methods
<b>B6</b> Acts in an ethical and professional manner.	Professional discussion underpinned by a portfolio of evidence
<b>B7</b> Leads by example being an advocate for change and sustainable approaches.	Project with report, presentation and questioning

### Mapping of KSBS to grade themes

[Edit add grade themes form](#)[Edit mapping of ksbs to grade themes form](#)

### Project with report, presentation and questioning

KSBS GROUPED BY THEME	Knowledge	Skills	Behaviour
Project delivery K3 K4 K6 K7 K8 K15 K16 K17 K22 K24 K27 S1 S3 S4 S5 S9 S13 S15 S19 S23	<p>Principles and applications of mechanics in an electrical and electronic engineering environment: motion, energy and force to ensure that systems and components function safely, efficiently and reliably. (K3)</p> <p>Factors that determine material, equipment and component selection. For example, quality, efficiency, performance, manpower and layout. (K4)</p> <p>Principles of mathematics and scientific methods including analytical techniques. Evaluating statistical data, complex numbers and matrices required in an electrical and</p>	<p>Translate conceptual ideas or technical requirements into developmental outcomes, operational designs, or specifications for electrical and electronic projects or programmes of work. (S1)</p> <p>Collate, store, use and present data and supporting documentation. (S3)</p> <p>Interpret and produce technical documentation such as schematic and circuit diagrams, engineering drawings</p>	None

KSBS GROUPED BY THEME	Knowledge	Skills	Behaviour
	<p>electronic engineering environment. (K6)</p> <p>Electrical and electronic engineering principles used in the design and development of components equipment and systems including electromagnetism, the laws and theorems that govern electronic circuits: function of common digital and analogue electronic devices, passive circuit behaviour, modelling circuits, active electronic components, transformers, AC/DC, power electronics, motors and drives. (K7)</p> <p>Data collection, storage, and presentation techniques. (K8)</p> <p>Management of change (MOC) processes: requesting change, determining viability, planning, implementing and evaluating changes to a product, system or component. Use of data to support change. Adherence to MOC, risks and limitations of MOC approval. (K15)</p> <p>Principles of Computer Aided Design (CAD) and the application in an electrical</p>	<p>or 3D CAD models, simulation models, engineering reports, test reports, fault reports or data analytics. (S4)</p> <p>Observe, record and draw accurate and auditable conclusions from data evidence. (S5)</p> <p>Identify and use processes, resources and technologies to complete electrical and electronic engineering projects or programmes of work. (S9)</p> <p>Create, maintain and review project documentation. Record and action any non-conformities. (S13)</p> <p>Communicate in writing, for example technical reports, documents and presentations. (S15)</p> <p>Consider management of change (MOC) requirements when undertaking</p>	

KSBS GROUPED BY THEME	Knowledge	Skills	Behaviour
	<p>and electronic engineering environment. (K16)</p> <p>Principles and applications of simulation software in an electrical and electronic engineering environment. (K17)</p> <p>Manufacturing methods, processes and technologies, for example assembling components or sub-systems into finished electrical and electronic equipment or systems. (K22)</p> <p>Written communication techniques. Plain English principles. Electrical and electronic engineering terminology. Report writing, presentations, data analysis documentation. (K24)</p> <p>Project documentation: ownership, company procedures, selection and appropriate use. (K27)</p>	<p>manufacturing projects or programmes of work. (S19)</p> <p>Ensure that all systems or equipment has been correctly configured, checked and tested for safe operation, efficiency and reliability. (S23)</p>	
<p>Safety and sustainability K1 K2 K26 S8 S20 B1 B7</p>	<p>Safety and security legislation, regulations and standards associated with an electrical and electronic engineering environment. Cyber security and statutory safety standards. (K1)</p>	<p>Comply with statutory and organisational safety and security standards and requirements, supporting safety risk assessments and mitigate any risks identified within the</p>	<p>Promotes a healthy and safe working environment. (B1)</p> <p>Leads by example being an advocate for</p>



KSBS GROUPED BY THEME	Knowledge	Skills	Behaviour
	<p>Hazards, risks and safe systems of work in an electrical and electronic engineering environment including design safety of high voltage systems. (K2)</p> <p>Environmental and sustainability legislation, regulations and standards associated with an electrical and electronic engineering environment. Carbon zero, recycling and reusability targets. (K26)</p>	<p>design, manufacture, development or test activity. (S8)</p> <p>Comply with environmental and sustainability legislation, regulations and standards associated with the manufacturing engineering environment. Uses resources efficiently, for example waste minimisation. (S20)</p>	<p>change and sustainable approaches. (B7)</p>
<p>Leadership and management K9 K18 S6 S7</p>	<p>Project commercials: delays, changes and impacts. (K9)</p> <p>Project management techniques for project delivery: planning, cost and budget control, risk, and quality. (K18)</p>	<p>Manage assigned projects or programmes of work, taking into account factors such as planning, safety, quality, cost, performance and sustainability. (S6)</p> <p>Apply processes for project or programme management such as escalation, audit or risk management and risk mitigation. (S7)</p>	<p>None</p>

**Professional discussion underpinned by a portfolio of evidence**

KSBS GROUPED BY THEME	Knowledge	Skills	Behaviour
<p>Electrical and electronic activities K20 K28 K29 K30 S11 S21</p>	<p>Control and instrumentation: principles of analogue and digital control systems including transducer systems and operation; measurement applications and error; principles of closed loop control systems, block diagrams. (K20)</p> <p>Pre-operation checks required on electrical and electronic systems and components. (K28)</p> <p>Digital and embedded system principles including embedded systems and their development, number systems, Boolean algebra, logic gates, logic expressions, combinational logic, analogue to digital and digital to analogue converters, computer and microcomputer systems and architectures. (K29)</p> <p>Principles of software development and testing including coding languages and methodologies used to evaluate and verify the software meets the required specification in an electrical and electronic engineering environment. (K30)</p>	<p>Carry out pre operations checks of electrical and electronic engineering systems and equipment before use. (S11)</p> <p>Ensure equipment is managed and maintained. (S21)</p>	<p>None</p>

KSBS GROUPED BY THEME	Knowledge	Skills	Behaviour
<p>Problem solving and improvement K10 K11 K13 K14 S2 S10 S12 S22 B2 B3</p>	<p>Techniques used for improving and enhancing electrical and electronic components, equipment and systems: safety, reliability, quality, performance and sustainability. (K10)</p> <p>Problem solving tools and techniques for establishing performance characteristics, for example: Define, Measure, Analyse, Improve and Control (DMAIC), Failure Mode Effect Analysis (FMEA), Plan-Do-Check-Act (PDCA), Fishbone diagrams. (K11)</p> <p>Processes used to optimise safety, efficiency, performance, productivity and sustainability. (K13)</p> <p>Quality management and assurance processes. (K14)</p>	<p>Select, use and apply approved problem-solving methods to solve problems and determine solutions or actions. (S2)</p> <p>Apply quality management and assurance processes to identify and rectify faults, inaccuracies, discrepancies or unexpected results during the electrical and electronic engineering process. (S10)</p> <p>Manage continuous improvement activities using techniques such as such as Six Sigma, 5s, Kaizen, Lean, Kanban, Statistical Process Control or Value Stream Mapping. (S12)</p> <p>Optimise processes and procedures, such as relating to safety, efficiency, performance, productivity and sustainability. (S22)</p>	<p>Take responsibility for the compliance and quality of work in their area and enable others to meet these standards. (B2)</p> <p>Agile and resilient in dealing with new and changing situations. (B3)</p>

KSBS GROUPED BY THEME	Knowledge	Skills	Behaviour
<p>Values and professional behaviours</p> <p>K5 K12 K19 K21 K23 K25 S14 S16 S17 S18 B4 B5 B6</p>	<p>Verbal communication techniques. Giving and receiving information. Matching style to audience. Barriers in communication and ways to overcome them. (K5)</p> <p>Workplace training and development techniques: personal and professional development. Coaching and transfer of knowledge. (K12)</p> <p>Current and emerging technology in an electrical and electronic engineering environment: mechanical and electrical integration, digitalisation, artificial intelligence, Internet of Things, automation, robotics, 3D printing, awareness of cloud computing and cyber security. (K19)</p> <p>Collaboration working methods with stakeholders: best practice, quality and performance measures, issue resolution. (K21)</p> <p>Teamwork and leadership: negotiation techniques, conflict management and development techniques. (K23)</p>	<p>Communicate with others verbally, for example colleagues and stakeholders. (S14)</p> <p>Collaborate with colleagues and stakeholders. Manage differing and competing interests with stakeholders. (S16)</p> <p>Identify and complete opportunities for personal and professional development including keeping up to date with current and emerging technology. (S17)</p> <p>Apply and promote policies and practices to support equity, diversity and inclusion. (S18)</p>	<p>Supportive of the needs and concerns of others, especially where this relates to diversity and inclusion. (B4)</p> <p>Committed to maintaining and enhancing competence of self and others through Continued Professional Development (CPD). (B5)</p> <p>Acts in an ethical and professional manner. (B6)</p>

KSBS GROUPED BY THEME	Knowledge	Skills	Behaviour
	Equity, diversity, and inclusion in the workplace. Unconscious bias. (K25)		

**Supporting information**

**External quality assurance**

[Edit external quality assurance - eqa form](#)

**Option selected:** Office for Students (OfS)

**Involved employers**

BMW Group UK, EEF, Ford, GTA England, Institution of Mechanical Engineers, Jaguar Land Rover, NFEC, Siemens, Toyota Manufacturing UK, Vauxhall Motors

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