

Utilities Engineering Technician (UET) Level 3 Apprenticeship Standard

End-point Assessment Handbook

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1. About the Apprenticeship

There are 3 key documents applicable to all apprenticeship standards:

1. Apprenticeship Standard - detailing the knowledge, skills and behaviours of the apprenticeship standard. Available [here](#).
2. Apprenticeship Assessment Plan - detailing the requirements of the end-point assessment. Available [here](#).
3. Education & Skills Funding Agency funding rules - detailing the rules for the public funding of apprenticeships in England. Available [here](#).

Within the UET Standard, there are three pathways / specialisms to choose from:

1. Mechanical
2. Electrical
3. Instrumentation, Control & Automation

2. About End-point Assessment

End-point assessment allows an apprentice to demonstrate the required knowledge, skills and behaviours, to complete and achieve their apprenticeship.

It is taken by apprentices at the very end of the on-programme phase of training when their employer (and in some cases their training provider/employer) is satisfied that they have met the “gateway” criteria to undertake the assessment.

To ensure apprentices are assessed consistently and comparably, an independent organisation must be selected by an employer to carry out the end-point assessment of each apprentice. These are end-point assessment organisations.

End-point assessment is graded as defined in the published end-point assessment plan. An apprenticeship certificate is only awarded after end-point assessment is successfully completed.

3. End-point Assessment Gateway

Each apprenticeship standard and assessment plan detail the pre-requisites that every apprentice must have completed before entering the end-point assessment phase of their apprenticeship. This is known as the gateway to end-point assessment.

The employer must conduct a gateway review with the apprentice, supported where appropriate by the provider, who in turn will have a continuing duty of care for the apprentice as they undertake end-point assessment.

To support the gateway, process the EUIAS have designed a gateway review document to summarise the high level end-point assessment entry requirements and to provide a template to record the results of the gateway and the employer and provider declaration. This is attached as appendix xx. This must be submitted to the EUIAS before apprentices can enter end-point assessment.

Any qualifications that are mandatory for the achievement of the apprenticeship or at gateway must be evidenced as part of this gateway review process. The evidence must be submitted to the EUIAS. A certified copy of required certificate(s) must be attached from the awarding body, a print out of the personal learner record from the Learning Records Service, or a formal transcript of results from the awarding organisation. The responsibility for ensuring acceptable English and mathematics achievement rests with the employer/training provider. More details can be found in the apprenticeship funding and performance management rules available [here](#).

Employers must satisfy themselves that apprentices are ready for their end-point assessment. Apprentices must demonstrate that they meet the following criteria:

- Achieved a minimum level 2 English and mathematics
- Satisfactory completion of the formal training plan agreed with the apprentice by the employer
- Sufficient evidence in the form of a portfolio to allow the apprentice to consistently demonstrate knowledge, skills and behaviours as described in the standard

Although the apprentice should only be recommended for end-point assessment when they are ready, employers should have a remediation process in place to support any apprentice who fails to meet the conditions of the end point assessment.

It is recommended that apprentices are not entered into end-point assessment if they are subject to a live disciplinary or written warning.

4. End-point Assessment Process

The end-point assessment may be completed over a three month period to accommodate work scheduling and cost effective planning of resources.

Successful achievement of the end-point assessment will lead to final certification of the apprenticeship and demonstrate that the apprentice is a fully competent technician. It uses the following assessment tools:

- Knowledge assessment; independently marked by an assessment organisation (weighting 30%)
- Portfolio assessment, incorporating work log summative assessment and trade test documentation; marked by technical experts usually sourced from the apprentice's employer (weighting 70%)

5. End-point Assessment Activities

Stage 1- Knowledge Assessment

Apprentices will be required to complete a standardised knowledge assessment that will be administered and marked by an independent assessment organisation. The assessment will enable apprentices to demonstrate knowledge across the Utilities Engineering Technician standard - core requirements, as appropriate i.e. mechanical, electrical, instrumentation control and automation (ICA).

The knowledge assessment will be a multiple-choice paper, containing 50 questions and taken by the apprentice under examination conditions. It will be a maximum of 90 minutes and will be either electronic or paper based question paper. It has a 20% weighting of the final grading.

The questions will be determined and standardised by the Energy & Utilities Independent Assessment Service (EUIAS) in consultation with representative employers.

Apprentices will be questioned against the 5 core technical knowledge elements:

- Relevant industry health and safety standards and regulations, and environmental and regulatory requirements
- Maintenance practices, processes and procedures covering a range of waste and water systems, plant and equipment
- Relevant level of theory and principles that underpin the design and function of electro-mechanical and instrumentation systems and equipment
- Principles and processes that underpin the location, diagnosis and rectification of faults
- Planned, reactive, and predictive maintenance processes, practices and procedures

These are further expanded as detailed below:

Relevant industry health and safety standards and regulations, and environmental and regulatory requirements

- COSHH
- Asbestos awareness
- Working at height
- First aid
- Risk assessment
- PPE
- Isolation procedures
- Reporting accidents/incidents
- Handover
- Manual handling
- RIDDOR
- Confined space
- Signs & symbols
- LOLER

Maintenance practices, processes and procedures covering a range of waste and water systems, plant and equipment

- Types of maintenance
- Isolation procedures
- Work schedules
- Specifications
- Engineering terminologies
- Testing
- Tools

Relevant level of theory and principles that underpin the design and function of electro-mechanical and instrumentation systems and equipment

- Engineering mathematics
- Engineering theories & principals
- Engineering terminologies
- Life cycles
- Specifications

Principles and processes that underpin the location, diagnosis and rectification of faults

- Theories and principals of fault finding
- Engineering calculations
- Process measurement equipment
- Legislation
- Tolerances

Planned, reactive, and predictive maintenance processes, practices and procedures

- Types of maintenance
- Test equipment
- Maintenance procedures
- Inspection
- Test procedures
- Tools

Apprentices will be advised to carry out revision across all subject areas in advance of the knowledge assessment. A pass will be a minimum of 70% with a distinction for this element awarded to those with 90% or above.

The outcome of the knowledge assessment will be submitted to the final decision panel.

Stage 2 - Trade Test & Portfolio Assessment

Trade Test

Apprentices will complete a practical assessment known as ‘trade test’ in the last three months, providing the opportunity to synoptically demonstrate core and specific knowledge, skills and behaviours e.g. the apprentice could be assigned a task to diagnose and rectify fault(s).

The apprentice will need to apply the appropriate principles, procedures and knowledge and explain what and why they are undertaking a particular approach.

They will be expected to select and use the appropriate equipment and tools, protect themselves and others from potential harm that can arise from their work, while ensuring other processes on site continue to function; effectively and efficiently maintaining production.

Mechanical Engineers can expect to be assessed on a range of equipment that could include:

- Pump overhaul
- Screen inspection
- Pipework dismantle and assembly
- Machining
- Valve overhaul
- Transmission inspection

Electrical Engineers can expect to be assessed on a range of equipment that could include:

- Electric actuator overhaul
- Inverter direct replacement
- Inverter upgrade
- Motor direct replacement
- Motor upgrade
- Install and test a 3 or single phase supply
- Preventative maintenance on a circuit and/or distribution system
- Intelligent starter replacement

Instrumentation, Control & Automation Engineers can expect to be assessed on a range of equipment that could include:

- Install and commission a transducer
- Replace a transducer
- Add additional signals to SCADA or HMI equipment
- Replace an Ethernet switch
- Fault find and diagnosis on a SCADA or HMI system
- Fault find and diagnosis on ICA system(s)
- Configure inter PLC communications
- Write PLC control logic and back up program

The assessment organisation will develop and hold a bank of trade tests covering core and specific requirements. Standardised documentation will be used to outline the test requirements, assessment criteria and to record decisions. An approved test will be released to the apprentice's employer on application, to be completed in the specified end-point period. Trade tests will be administered and marked by a technical expert, which may or may not be the same person as the technical expert who undertakes the portfolio review.

The test will be awarded a pass or fail.

The assessment report on the trade test must be included in the apprentice's portfolio.

Portfolio Assessment

The apprentice will submit a portfolio consisting of a work log typically developed during the last two years of the apprenticeship, together with documentation from a trade test completed in the final three months.

The portfolio provides the opportunity to demonstrate knowledge, skills and behaviours across the standard - core and specific requirements. The portfolio will be marked by a technical expert, using standardised criteria and documentation; recording coverage against the standard, highlighting any performance above or below and awarding a preliminary mark out of 100.

Work Log

As the apprentice progresses through their training, they should build up evidence on the full range of knowledge, skills and behaviours required by the standard and be assessed on particular tasks or procedures or items of equipment - 'progressive authorisation assessments'. 'Safe isolation of operational equipment for maintenance' is one example of this type of progressive authorisation assessment, applicable to all Utility Engineering Technicians. It is industry practice that authorisation assessments are recorded in a work log.

The work log must be sufficient to evidence the apprentice can apply knowledge, skills and behaviours required in a variety of tasks. Progress review documentation should also be included. The apprentice's supervisor will typically support the development of the work log in accordance with company policy and procedures, although the assessment organisation will provide guidance on the content of the work log.

As part of the end-point assessment, a technical expert will review the apprentice's work log and undertake a summative assessment of competence against the standard's knowledge, skills and behaviours:

Mechanical Engineers will need to demonstrate they can:

- Carry out basic fabrication and welding of structures and components
- Use mechanical knowledge and skills to install, maintain and dismantle a wide range of complex plant, machinery and components
- Consult design specifications to analyse and calculate mechanical system parameters and rectification procedures.
- Test, service and repair mechanical equipment as part of planned preventative maintenance and/or reactive maintenance programmes
- Install and maintain mechanical components including motors, pumps and gearboxes, maintaining and replacing lubricants.
- Inspect and maintain condition monitoring equipment

Electrical Engineers will need to demonstrate they can:

- Test, service and repair electrical equipment as part of planned preventative maintenance and/or reactive maintenance programmes
- Install and connect electrical cables, switchgear, circuit breakers, motors, transformers and other associated equipment.
- Carry out electrical procedures on industrial low voltage systems (up to 1000V AC) operating switchgear, fuses, motor control centres, transformers, manual & automatically controlled drives and motors.
- Carry out basic fault diagnosis on Programmable Logic Controllers (PLCs) and Supervisory Control & Data Acquisition (SCADA) systems

Instrumentation, Control & Automation Engineers need to demonstrate they can:

- Use Instrumentation and Control Systems knowledge and skills to install, maintain and dismantle instruments, controllers, probes, attachments, cabling, meters and display units.
- Carry out telemetry outstation and internal system configuration
- Identify and resolve data quality and calibration issues
- Test, calibrate and validate fixed and portable analogue and digital instrumentation using approved procedures and standards.
- Repair, maintain, configure and calibrate field instrumentation, communication devices and associated equipment used in system and process control, such as Programmable Logic Controllers (PLC) and Supervisory Control & Data Acquisition (SCADA) systems

The evidence in the work log should be based around quality rather than quantity and therefore apprentices and mentors alike should ensure that the evidence added to the

portfolio is accurate and of good quality for tasks of a complex nature and not those that would be considered simple and/or routine.

The selected tasks should also cover a wide range of work-based activities identified in the core skills and specific requirements of the apprentice's pathway. These may include, but are not limited to:

- Locate, diagnose and rectify faults
- Inspect and monitor
- Test
- Install
- Maintain
- Repair

Review the individual pathway standard and/or the UET Portfolio Guidance document for more detail.

Grading Criteria

The apprenticeship will be graded fail, pass and distinction. The final grade will be determined by collective performance in the end-point assessment's two assessment tools.

A points system will determine if the apprentice has achieved a pass or distinction and is described below:

- Pass - minimum 2 points (1 point portfolio + 1 point knowledge assessment)
- Distinction - minimum 8 points and maximum 10 points

Minimum combinations:

- Portfolio 5 points + 3 points knowledge assessment = 8 points
- Portfolio 6 points + 2 points knowledge assessment = 8 points
- Portfolio 7 points + 1 point knowledge assessment = 8 points

Portfolio %	Points	Grade	Knowledge Assessment %	Points	Grade
<69	0	Fail	<69	0	Fail
70	1	Pass	70 - 79	1	Pass
71 - 74	2	Pass	80 - 89	2	Pass
75 - 79	3	Pass	90 - 100	3	Distinction
80 - 84	4	Pass	-	-	-
85 - 89	5	Distinction	-	-	-
90 - 94	6	Distinction	-	-	-
95 - 100	7	Distinction	-	-	-