T-LEVELS | IfATE Institute for Apprenticeships and Technical Education

T Level in Engineering and Manufacturing for Design and Development

8714-322 Electrical and Electronic Occupational Specialism Report (Summer 2024)

Version 1.0

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Contents

Foreword

Summer 2024 Results

The occupational specialism qualification is made up of one component, which need to be successfully achieved to attain the T Level Electrical and Electronic Occupational Specialism.

We discussed the approach to standard setting/maintaining with Ofqual and the other awarding organisations before awarding this year. We have agreed to take account of the newness of qualifications in how we award this year to recognise that students and teachers are less familiar with the assessments (grading-arrangements-for-vtqsand-technical-qualifications-within-t-levels-in-the-academic-year-2023-to-2024), whilst also recognising the standards required for these qualifications.

Introduction

This document has been prepared to be used as a feedback tool for providers in order to support and enhance teaching and preparation for assessment. It is advised that this document is referred to when planning delivery and when preparing candidates for the T Level Technical Qualification (TQ) in Engineering and Manufacturing **Occupational Specialisms.**

This report provides general commentary on candidate performance in the occupational specialism assignment. It highlights common themes in relation to the technical aspects explored within the assessment, giving areas of strengths and weakness demonstrated by the cohort of candidates who sat assessments in the summer 2024 assessment series.

The grade boundaries that were used to determine candidate's final summer 2024 results are also provided. **For summer 2024, as per Ofqual guidance, the approach to grading recognises that these are new qualifications.**

8714-322 Electrical and Electronic Occupational Specialism

Task 1 – Design:

Candidates are required to produce a design specification outlining the design for the circuitry (by referring to the design criteria). Research of control mechanisms, sensors and visual/aural outputs should be evidenced. Appropriate configurations should be included e.g. circuit diagrams and PCB layouts. Calculations should be evident e.g. timings, LEDs/resistors, power etc. A bill of materials should be included where components are listed with part numbers/suppliers and costs. Virtual modelling should be evidenced to show function and operation of circuit elements.

Higher performing candidates showed a high-level understanding of Health and Safety legislation and made relevant references throughout the design specifications. The design specification was detailed, and references were included throughout for most candidates. Justifications for the sensors and electronic system were concise and choices were evidenced through detailed calculations.

Diagrams were detailed, concise and mostly evidenced functionality (through the use of virtual modelling) of the circuit. A detailed 'Bill of Materials' evident, which would allow a third party to order direct from component suppliers.

Lower performing candidates provided limited evidence of understanding health and safety in their design specification and were unable to demonstrate comprehensive knowledge and understanding of design principals and processes relating to the design criteria. Candidates design calculations were brief and, in some cases, missing from the evidence submitted. Virtual modelling and circuit diagrams were limited and tended to show one minor aspect of the final circuit e.g. a LED and resistor. The design specifications were brief, and evidence of investigation/research was considerably weaker.

Actions providers can take to support assessment preparation for future series:

Embed technical report writing and referencing into the teaching/curriculum. This was only evident in a few providers, but those candidates were more confident and adept at tackling task 1.

Design specifications were of a reasonable standard but it would be recommended that more preparation time could be spent analysing design criteria and specifications. Many candidates did not discuss Health and Safety in the design specification.

Simulations and virtual modelling should be used regularly within the prior teaching sessions to enable candidates to become adept at using investigation to develop functional circuits. These sessions could embed use of design calculations for correct selection of components. Design, building and testing (using a selection of meters/virtual tools) of prototype circuits using breadboard should be included in teaching sessions leading up to the assessment window.

Task 2 Manufacture and test:

Candidates are required to produce a detailed risk assessment that considers all stages of the manufacturing and testing process in a logical order.

Higher performing candidates demonstrated outstanding manufacturing skills e.g. soldering and use of tools/equipment. Comprehensive testing was evident in line with the design criteria. Risk assessments were detailed, measurable and included all mitigations. Evidence of safe working practices throughout e.g. use of PPE and safe use of tools and maintaining and reinstating of the work area relating to all tasks.

Lower performing candidates did not demonstrate full functionality or manufacturing processes and procedures relating to the prototype. Soldering skills were of poorer and limited evidence of safe use of tools and equipment. Test records were brief and, in some instances, missing from the evidence demonstrating limited understanding of the circuit and design specification requirements.

A number of candidates appeared unfamiliar with the equipment used for etching or CAM milling, leading to hesitant and unconfident processes with a lower quality of PCB production overall.

Actions providers can take to support assessment preparation for future series:

It would be recommended, that providers ensure equipment is fully functional and that candidates have multiple opportunities to use the equipment to produce PCBs and are confident and competent at using it in readiness for assessment.

Candidates should have ample opportunity to test circuits - both with meters and virtual modelling.

Candidates should be adept at writing risk assessments which are measurable and have a key explaining the scoring system used to produce it.

Task 3 Peer review:

Candidates are required to present designs to their peers verbally using annotated sketches and diagrams, explaining their design. They are then required to collaborate with peers to inform their own design, and peer review other peers designs providing feedback.

This task is not awarded marks and is supplementary evidence to support candidates final design choices, of which they present in Task 4.

Some candidates provided more detailed feedback forms to support evidence of peer discussions and presentations to help support and inform modifications to their design proposals.

Some candidates did not provide constructive feedback to enable peers to modify their design proposals lacking sufficient information to support improvements.

Actions providers can take to support assessment preparation for future series:

Ensure peer review feedback is checked prior to sharing with the candidate, to ensure it is appropriate and sufficient detail to inform design. Feedback should be realistic and meaningful to help inform the candidates final designs for Task 4.

Task 4 Evaluation and implementation:

The candidate is required to consider revisions to the original virtual model, demonstrating how they have considered the peer feedback they received in order to improve the design of the circuitry, providing justifications for amending/not amending their designs.

Higher performing candidates produced detailed implementation/evaluation reports and revision control documents. Changes made were evident (using feedback from peer review) and thoroughly justified. Reports were well written and concise. Test records and processes were discussed in detail.

Lower performing candidates had limited evaluations and/or justifications in their implementation report. Some candidates had no revision control documents or test records. Very limited use of peer review feedback was evident.

Actions providers can take to support assessment preparation for future series:

Evidence of modification must be clear, concise and justified and if no modification is needed detailed justifications as to why. Reports e.g. revision control document must be detailed with referencing and use of accurate technical terminology.

Best practice and guidance to providers on potential areas for improving performance in assessment

It is recommended that providers utilise and deliver the sample assessments as formative assessment to support candidates in preparation for summative assessment. This will not only help prepare candidates but will be an ideal opportunity for marker training and standardisation.

The centre staff and candidates must thoroughly read the assessment to ensure the work is carried out to the design criteria required. Moderators will be working to the assessment brief and marking grids and making judgments accordingly.

Appropriate PPE should be worn at all times and assessors should ensure that candidates are working safely and should not come to harm or risks to health from the materials, tools or equipment used in the assessment.

Where photographic evidence is requested ensure stages of production and the final prototypes are included.

Photographs do not need to be great in number but do need to show everything a moderator would require to be able to perform the remote moderation work. Photos need to be of sufficient resolution to enable “zooming in” to determine quality. Photographs should be collated into one document, and well labelled, and with commentary if possible.

Videos will need to show specific and important points of the assessment, for instance the candidate completing prototype testing/functionality.

Utilisation of the Photographic Evidence Guidance Document would support providers to capture relevant and valuable information for marking and moderation purposes to support practical observation feedback.

Providers should ensure that practical observation forms are detailed, covering all aspects of the activity being observed. The practical observation records should contain accurate information, specific to the candidate being observed and offer differentiating commentary between individual candidate’s performance utilising the marking grid terminology. They should also identify areas of strength and weakness to distinguish between the different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.

For future series it is important providers understand CAD files are not compatible and all images need to be screenshot and submitted in one document.

Ensure all tools and equipment are I full working order prior to commencing the assessments and ensure there are sufficient resources for the size of the cohort to avoid delays in completion of practical activities.

Support materials

Sample and Past Occupational Specialism (OS) Assessments:
It is recommended that Providers utilise and deliver the **sample OS** as well as **past OS** (if available) as formative assessment to support candidates in preparation for summative assessment.

Sample and past OS (if available): T Level Practical Assignment (Electrical and electronic engineering) Assessor Pack Sample (cityandguilds.com)

Guide Standard Exemplification Material (GSEM) Assessments:
It is also recommended that Providers utilise the **GSEMs** to help understand the standard required to achieve a Distinction and Pass grade.

8714-322 OS Distinction GSEM: T Level Technical Qualification in Design and Development for Engineering and Manufacturing Electrical and electronic engineering (cityandguilds.com)

8714-322 OS Pass GSEM: T Level Technical Qualification in Design and Development for Engineering and Manufacturing Electrical and electronic engineering (cityandguilds.com)

TQ Occupational Specialism Assessment Process Guide:
The guide gives support to Providers in preparing for and delivering T Level Occupational Specialism assessments.

Link: TQ Occupational Specialism Assessment process guide (cityandguilds.com)

Events and Webinars:
City & Guilds run free webinars and events throughout the year on preparing for and delivering the T Level Occupational Specialisms. The below link provides details on upcoming in person events, live webinars, on-demand webinars and preparation for the Occupational specialism assessment.

Link: Events and webinars - T Levels | City & Guilds (cityandguilds.com)

Grade boundaries

The table below shows the grade mark ranges for the Occupational Specialism **for the summer 2024 series.**

Grade	Mark range 8714-322
Distinction	66-90
Merit	51-65
Pass	37-50
Unclassified (U)	0-36

Get in touch

The City & Guilds Quality team are here to answer any queries you may have regarding your T Level Technical Qualification delivery.

Should you require assistance, please contact us using the details below:

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Web chat available **here**.