
Welcome to the T Level
Engineering & Manufacturing
The webinar will begin shortly
January 2023

Engineering and Manufacturing

T Level High Level Core Component Support Session

Using the webinar platform

Our action plan supports the planning and delivery stages to prepare for the TQ launch

Send any questions in the question area throughout the webinar

All attendees will be set to mute

Webinar resources will be shared on our website shortly after

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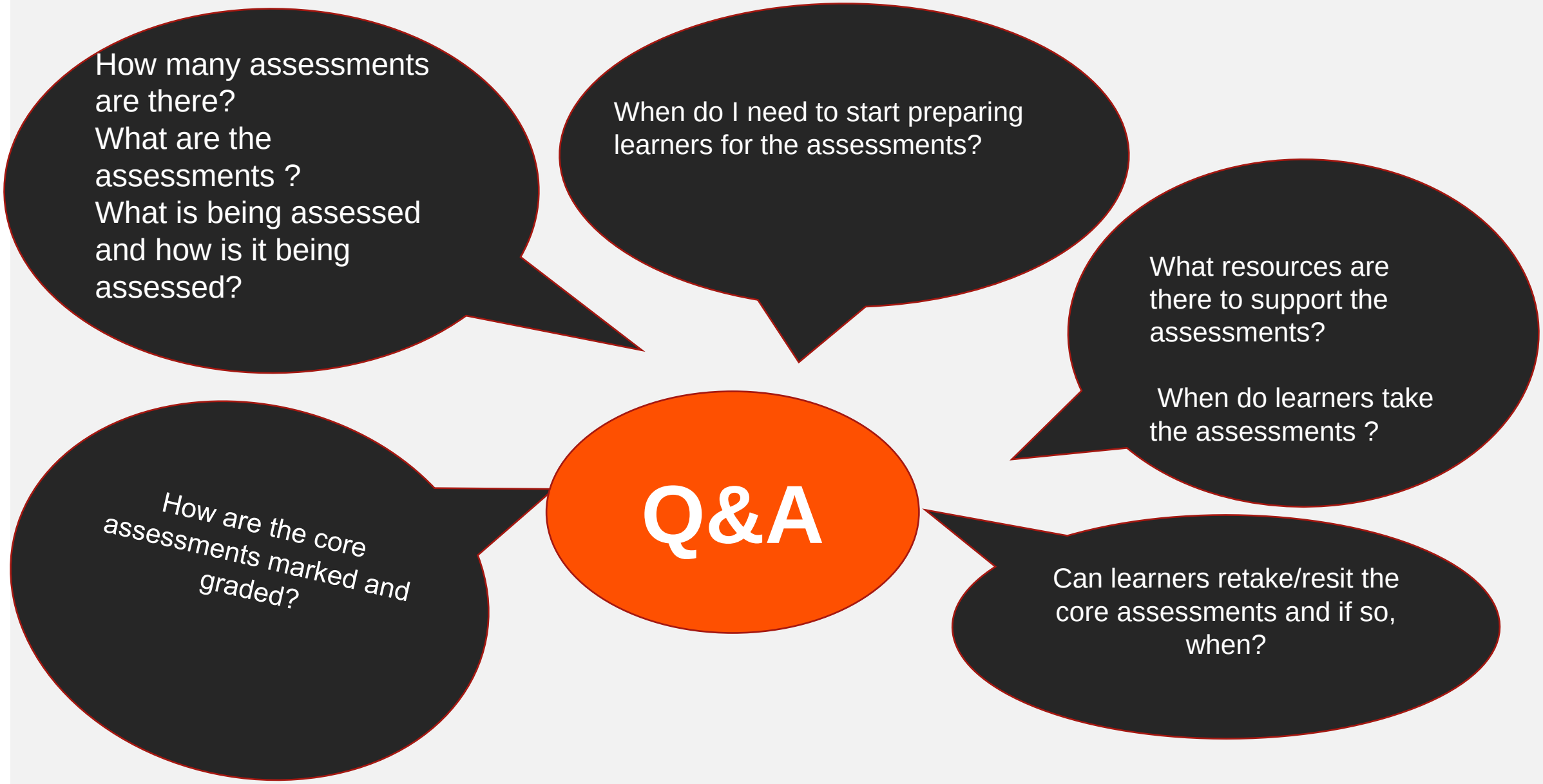
Agenda

- High level overview of the core assessments
- Assessment objectives-relating to question types
- Use of command verbs in questions
- Question types using sample assessments
- Hints and tips
- Teaching and Learning Guide
- Support resources

- Occupational specialism assessments
- Delivery and curriculum planning outside of the Technical Qualification
- Progression or industry placements.

High Level Overview of Core assessments for Engineering & Manufacturing


How many assessments are there?
What are the assessments ?
What is being assessed and how is it being assessed?
When do I need to start preparing learners for the assessments?
What resources are there to support the assessments?
When do learners take the assessments ?
Q&A
How are the core assessments marked and graded?
Can learners retake/resit the core assessments and if so, when?

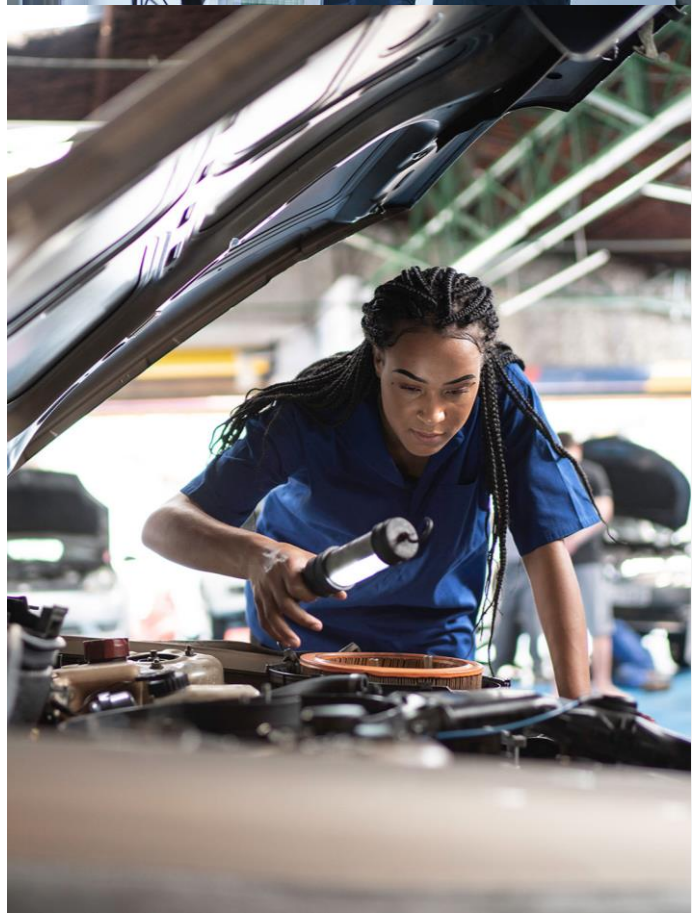
T Level Technical Qualifications

Maintenance, Installation and Repair for Engineering and Manufacturing	
8730 - 12	**Core**
8712 – 31	Mechanical
8712 – 32	Mechatronics
8712 – 33	Electrical & Electronics
8712 – 34	Control & Instrumentation
8712 – 35	Light & Electric Vehicles

Engineering, Manufacturing, Processing and Control	
8730 - 13	**Core**
8713 – 31	Fitting and Assembly Technologies
8713 – 32	Machining and Toolmaking Technologies
8713 – 33	Composites Manufacturing Technologies
8713 - 34	Fabrication and Welding Technologies

Design and Development for Engineering	
8730 – 14	**Core**
8714 – 31	Mechanical Engineering
8714 – 32	Electrical & Electronics Engineering
8714 – 33	Control & Instrumentation Engineering
8714 – 34	Structural Engineering

Registration information- Core first before OS



Overview of the Core Assessment for Engineering & Manufacturing

Learners must complete:

- **Two** externally set exams covering knowledge from the Engineering core (component 680)
- **One** employer-set project covering knowledge and skills from either pathway. **Note:** ESP is different for each pathway (component 680)

Technical Qualification scheme of assessment overview– Design & Development Pathway **(page 20 specification)**

Core component – Learners must complete all assessment components						
Assessment component	**Method**	**Duration**	**Marks**	**Weighting**	**Marking**	**Grading**
Exam paper 1	Externally set exam	2.5 hours	100	35%	Externally marked	This component will be awarded on the grade scale A* -E
Exam paper 2	Externally set exam	2.5 hours	100	35%	Externally marked	
Employer-set project	Externally set project	18.5 hours	90	30%	Externally marked	

Technical Qualification scheme of assessment overview – Maintenance, Installation and Repair Pathway (page 20 specification)

Core component – Learners must complete all assessment components						
Assessment component	**Method**	**Duration**	**Marks**	**Weighting**	**Marking**	**Grading**
Exam paper 1	Externally set exam	2.5 hours	100	35%	Externally marked	This component will be awarded on the grade scale A* -E
Exam paper 2	Externally set exam	2.5 hours	100	35%	Externally marked	
Employer-set project	Externally set project	12.5 hours	90	30%	Externally marked	

Technical Qualification scheme of assessment components – Manufacturing, Processing & Control Pathway

Core component – Learners must complete all assessment components						
Assessment component	**Method**	**Duration**	**Marks**	**Weighting**	**Marking**	**Grading**
Exam paper 1	Externally set exam	2.5 hours	100	35%	Externally marked	This component will be awarded on the grade scale A* -E
Exam paper 2	Externally set exam	2.5 hours	100	35%	Externally marked	
Employer-set project	Externally set project	15 hours	90	30%	Externally marked	

Engineering Core Theory Papers

The two exam papers have each been split into two sections which will be made up of different question types including short answer questions, structured questions, and extended response questions.

Both core exams will follow the same structure but each core exam covers different technical content. In both papers the level of difficulty will increase through the papers with lower demand questions at the beginning of the question paper to higher demand questions at the end of the question paper.

Paper 1 - Maths and Science Principles for Engineering (6 Elements) (2hrs 30mins)

Part A (70%) made up of 67 marks with 18 short and medium questions of a low tariff and medium tariff value. These short answer questions which target recall of knowledge, demonstration of understanding and application of knowledge and understanding.

Part B (30%) made up of 33 marks and includes 3 extended response questions which target application of knowledge and understanding and analysis and evaluation of information and issues.

	Element – Paper 1
4	Essential mathematics for engineering and manufacturing
5	Essential science for engineering and manufacturing
6	Materials and their properties
7	Mechanical principles
8	Electrical and electronic principles
9	Mechatronics

Engineering Core Theory Papers

The two exam papers have each been split into two sections which will be made up of different question types including short answer questions, structured questions, and extended response questions.

Both core exams will follow the same structure but each core exam covers different technical content. In both papers the level of difficulty will increase through the papers with lower demand questions at the beginning of the question paper to higher demand questions at the end of the question paper.

Paper 2 – Engineering in Context (11 Elements) (2hrs 30mins)

Part A (70%) made up of 67 marks with 11 short and medium questions of a low tariff and medium tariff value. These short answer questions which target recall of knowledge, demonstration of understanding and application of knowledge and understanding.

Part B (30%) made up of 33 marks and includes 3 extended response questions which target application of knowledge and understanding and analysis and evaluation of information and issues.

	Element – Paper 2
1	Working within the engineering and manufacturing sectors
2	Engineering and manufacturing past, present, and future
3	Engineering representations
10	Engineering and manufacturing control systems
11	Quality management
12	Health and safety principles and coverage
13	Business, commercial and financial awareness
14	Professional responsibilities, attitudes, and behaviours
15	Stock and asset management
16	Continuous improvement
17	Project and programme management

Technical Qualification – Employer Set Project

What is the ESP ?

The employer-set project is a classroom-based assessment undertaken in controlled conditions, (*not invigilated conditions)* as prescribed within the candidate and centre guidance packs.

The core employer set project (ESP) sub-component assesses the skills and application of the core knowledge of the TQ.
Each project will be developed together with employers in the industry to reflect realistic types of developments, activities and challenges.

The project is linked to the core skills: the candidate and centre guidance packs.

The project is made up of a number of tasks which all relate to the same Employer-set project brief; Each ESP will have different tasks relating to the specific pathways. For example in Design & Development the tasks are:

- Research
- Design
- Plan
- Present

The ESP is in the form of a realistic brief to be achieved through completion of research, plan, present, review tasks designed to elicit appropriate evidence for assessment under specified assessment conditions.

A new brief and tasks will be set each series covering different topics.

More Information on the ESP

The employer-set project samples content from across the core of the Technical Qualification (TQ). However, due to their importance all versions of the employer-set project will cover content from the following core underpinning knowledge outcomes of specific knowledge and skills for each specialism will be assessed in the practical assignments:

The project is linked to the core skills (each pathway has different core skills):

Design & Development core skills (page 16 onwards in the specification).

- Core Skill A (**DD-CSA**) Planning and preparation
- Core Skill B (**DD-CSB**) Communication
- Core Skill C (**DD-CSC**) Developing proposals and concepts
- Core Skill D (**DD-CSD**) Evaluation

Assessment overview:

The project only draws on the content from the common core knowledge and skills content that sit across all core modules for the Engineering & Manufacturing common core

Learners will be marked on the quality and accuracy of the written work they produce.

Employer Set project for D&D

Scheduling of the Employer-set project assessments

The Employer-set project assessment window will occur from March to May annually. Specific dates will be released annually through the key date schedule for the following academic year.

Task	Scheduling	Task duration
1 Research	City & Guilds sets the assessment window for the centre to timetable	3 hours
2 Design	City & Guilds sets the assessment window for the centre to timetable	8 hours
3 Plan	City & Guilds sets the assessment window for the centre to timetable	5 hours
4 Present	City & Guilds sets the assessment window for the centre to timetable	2.5 hours

A supporting document and guidance will be shared in advance of the assessment to support timetabling and planning for centres, for example outlining any required resources or conditions. This will be released to centres as part of the Key Dates Schedule.

Employer-set project

Assessment objective	Typical evidence	*Approximate weighting
AO1 Plan approach to meeting the brief	Evidence of a planned approach to work, considered sequence of activity, evidence of prioritisation, review and iterative working. Clearly structured response to brief, cohesive response with ordered sections, logical approach to referencing, research and use of sources, response completed meeting required parameters, sources used effectively and integrated into response, effective use of time allocation available for presentations.	13%
AO2 Apply core knowledge and skills as appropriate	Linking knowledge principles and ideas and applying them in context of the brief when considering compiling response use of materials, concepts etc. Applying core skills e.g. communication, planning etc appropriately throughout tasks within project.	50%
AO3 Select relevant techniques and resources to meet the brief	Analysis of key issues, drawing together considerations and considering impacts of elements on each other (not just in isolation), consideration and analysis of the reasons for doing things in a particular way.	13%
AO4 Use maths, English and digital skills	Use of correct terminology, abbreviations, units of measurement in context, consideration of audience of brief response (technical versus non-technical wording), use of calculations/diagrams etc appropriately, consideration of the use of ICT and digital methods both in brief response and in evidence presentation.	10%
AO5 Realise project outcome and review how well the outcome meets the brief	Considered analysis and evaluation of project outcome, response conclusion or evaluation, identification of solutions in response to brief problem with evidence of evaluation of other options and reasons for rejection of other options where not appropriate.	13%

*Weightings are rounded to the nearest whole number

Employer Set project for MIR

Task		Conditions	Evidence produced	Evidence submitted?	Timings	Marks available
1	Research	Supervised/ controlled	Technical brief, research notes, list of references/sources	Yes	3 hours	15
2	Report	Supervised/ controlled	Written report, drawings	Yes	4 hours	24
3	Plan	Supervised/ controlled	Planning chart, supporting statement	Yes	3 hours	18
4	Present	Supervised/ controlled	Presentation materials (slides, handouts etc), video recording of presentation	Yes	2.5 hours	24
				Total	12.5 hours	81
				Maths, English and digital skills*		9
				Total marks		90

*10% of the marks (i.e. 9 marks) allocated to maths, English and digital skills across all tasks.

Employer-set project

Component	Assessment method	Assessment weighting
AO1 Plan approach to meet brief	Evidence of a planned approach to work, considered sequence of activity, evidence of prioritisation, review and iterative working. Clearly structured response to brief, cohesive response with ordered sections, logical approach to referencing, research and use of sources, response completed meeting required parameters, sources used effectively and integrated into response, effective use of time allocation available for presentations.	13.3%
AO2 Apply knowledge and skills to contexts	Linking knowledge principles and ideas and applying them in context of the brief when considering compiling response use of materials, concepts etc. Applying core skills e.g. communication, problem solving appropriately throughout tasks within project.	50%
AO3 Select techniques and resources to meet brief	Analysis of key issues, drawing together considerations and considering impacts of elements on each other (not just in isolation), consideration and analysis of the reasons for doing things in a particular way.	13.3%
AO4 Use maths, English and digital skills	Use of correct terminology, abbreviations, units of measurement in context, consideration of audience of brief response (technical versus non-technical wording), use of calculations/diagrams etc appropriately, consideration of the use of ICT and digital methods both in brief response and in presentation.	10%
AO5 Realise project outcome and evaluate	Considered analysis and evaluation of project outcome, response conclusion or evaluation, identification of solutions in response to brief problem with evidence of evaluation of other options and reasons for rejection of other options where not appropriate.	13.3%

Employer Set project for EMPC

Task		Conditions	Evidence produced	Evidence submitted?	Timings	Marks available
1	Research	Supervised/ controlled	Research notes, list of references /sources	Yes	3 hours	15
2	Report	Supervised/ controlled	Written report	Yes	4 hours	18
3	Design	Supervised/ controlled	Assembly drawings, design calculations	Yes	6 hours	24
4	Present	Supervised/ controlled	Presentation materials (slides, handouts etc.), video recording of presentation	Yes	2.5 hours	24
				Total	15.5 hours	81
				Maths, English and digital skills*		9
				Total marks		90

Employer-set project

Component	Assessment method	Assessment weighting
AO1 Plan approach to meet brief	Evidence of a planned approach to work, considered sequence of activity, evidence of prioritisation, review and iterative working. Clearly structured response to brief, cohesive response with ordered sections, logical approach to referencing, research and use of sources, response completed meeting required parameters, sources used effectively and integrated into response, effective use of time allocation available for presentations.	13.3%
AO2 Apply knowledge and skills to contexts	Linking knowledge principles and ideas and applying them in context of the brief when considering compiling response use of materials, concepts etc. Applying core skills e.g. communication, problem solving appropriately throughout tasks within project.	50%
AO3 Select techniques and resources to meet brief	Analysis of key issues, drawing together considerations and considering impacts of elements on each other (not just in isolation), consideration and analysis of the reasons for doing things in a particular way.	13.3%
AO4 Use maths, English and digital skills	Use of correct terminology, abbreviations, units of measurement in context, consideration of audience of brief response (technical versus non-technical wording), use of calculations/diagrams etc appropriately, consideration of the use of ICT and digital methods both in brief response and in presentation.	10%
AO5 Realise project outcome and review how well the outcome meets the brief	Considered analysis and evaluation of project outcome, response conclusion or evaluation, identification of solutions in response to brief problem with evidence of evaluation of other options and reasons for rejection of other options where not appropriate.	13.3%

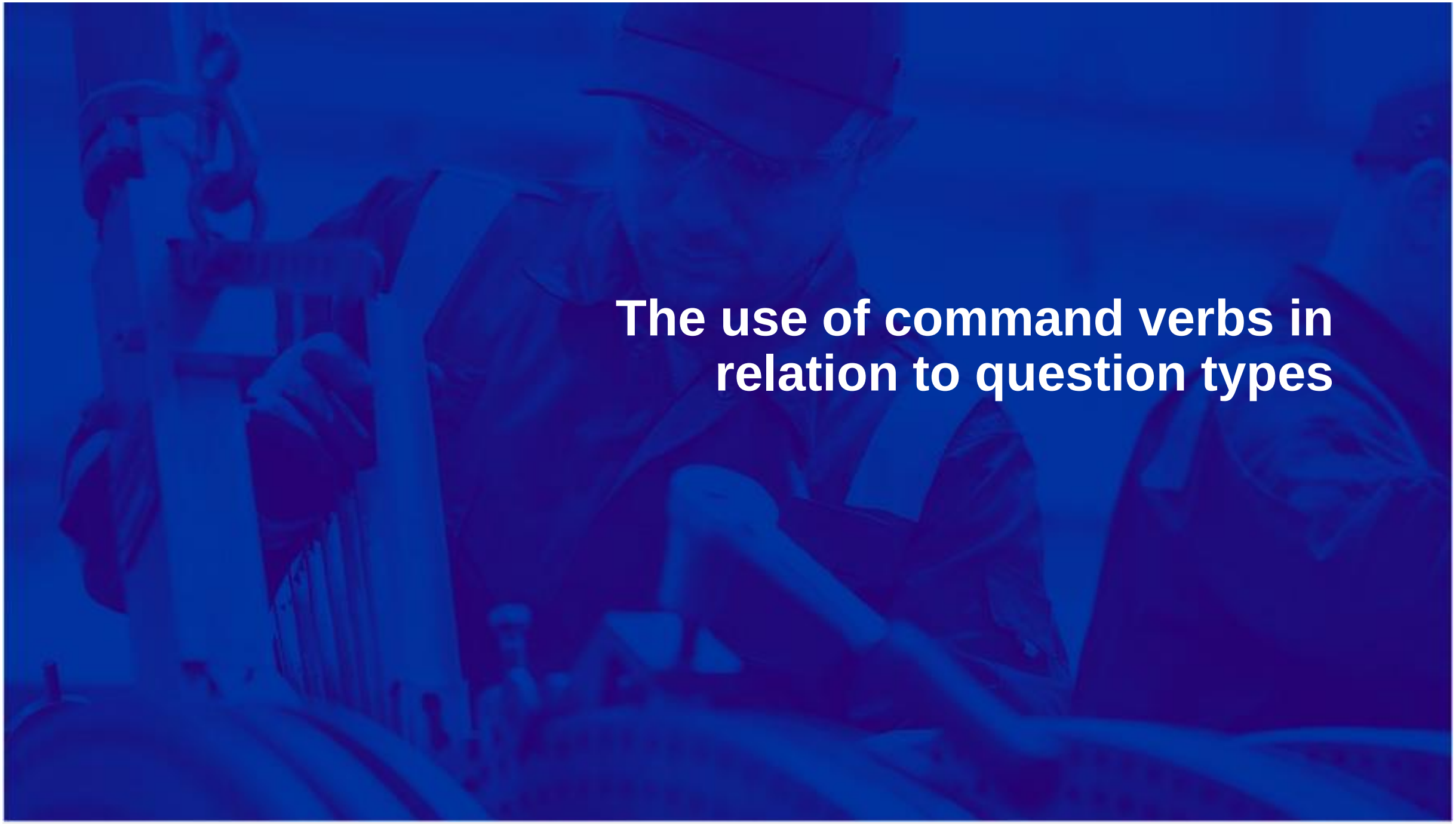
Timelines for assessments for curriculum planning

Core Assessments Summer 2023 assessment dates/windows	
Employer-Set Project (ESP) materials release	6 March 2023
Employer-Set Project (ESP) delivery window	13 March 2023 to 31 March 2023
Employer-Set Project (ESP) evidence upload deadline	31 March 2023
Exam Paper 1	6 June 2023 9:30-12:00*
Exam Paper 2	13 June 2023 9:30-12:00*
Special consideration requests deadline	Five working days after the exam/submission date

*Provisional until after General Qualifications (GQs) exam dates confirmed

Core Assessments Autumn 2023 assessment dates/windows	
Employer-Set Project (ESP) materials release	30 October 2023
Employer-Set Project (ESP) delivery window	6 November 2023 to 24 November 2023
Employer-Set Project (ESP) evidence upload deadline	24 November 2023
Exam Paper 1	28 November 2023 9:30-12:00*
Exam Paper 2	5 December 2023 9:30-12:00*
Special consideration requests deadline	5 working days after the exam/submission date

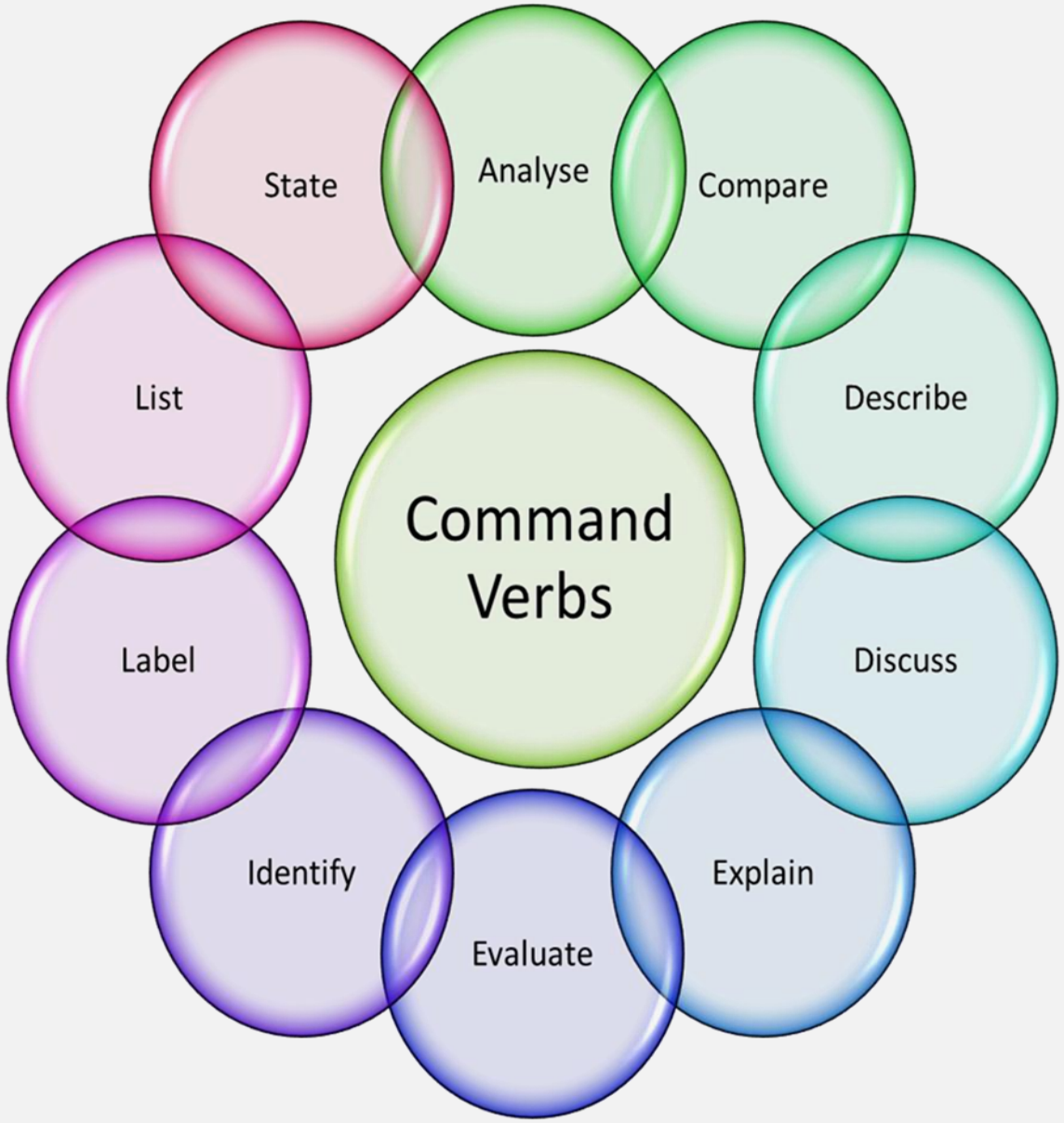
13th March -31st March 2023 ESP window opens–all tasks released to tutors one week beforehand to support planning
June 6th theory exam paper 1
June 13th theory exam paper 2


The use of command verbs in relation to question types

Exam Preparation

In examinations, certain words, often called command words, are used as prompts to give an indication to learners of the type of response that is expected by the question. These words include ‘state’, ‘describe’, ‘explain’ and ‘discuss’.

Command verbs in exam papers are the words your learners need to understand. They tell you what level of /depth of response the examiner is looking for.



Command word	Definition	Likely AO(s)
Identify	recognise something, usually from an image, and state what it is	AO1a
Label	add names or descriptions, indicating their positions, on e.g. an image/ drawing	AO1a
List	give as many answers/ examples as the question indicates	AO1a
State	give the answer, clearly and carefully	AO1a
Name	give the (technical) name of something	AO1a
Select	choose (e.g. the correct material/tool for the job) by making careful decisions	AO1a
Define	give the meaning of something, usually of a technical term	AO1a
Describe a…	write what something is like – usually what it looks, tastes, feels, sounds like etc,	AO1a
Describe the process for…	give the steps in a process	AO1a
Compare (…and contrast) (or ***describe*** the similarities/differences)	look for and describe the similarities (and differences) between two or more things/ circumstances	AO1b
Differentiate between	show or find the characteristic differences between two or more similar things/ concepts	AO1b
Distinguish between	describe the characteristic differences between two things, or make one thing seem different from another	AO1b
Annotate	add explanatory notes and comments	AO1b
Give example(s) **Illustrate/**	use examples or images to support, clarify or demonstrate e.g. an explanation	AO1b
Calculate	work out the answer to a problem using mathematical operators and concepts	AO1b
Summarise	give the main/ key points, which give a broad overview of something	AO1b
Explain the…	make clear or easy to understand by giving details and linked reasoning	AO1b

Command word	Definition	Likely AO(s)
Explain why /consequences of/ reasons for…	give the causes of/ rational for something	AO1b, AO2
Explain how…	Give the steps in e.g. a process, clarifying causal relationships	AO2/AO3
Discuss	talk/write about a topic in detail, considering the different issues, ideas, opinions related to it	AO3
Analyse	study or examine usually a complex issue in detail to identify essential elements, causes, characteristics etc	AO3
Give a rationale	Explain why you have taken particular actions/ decisions	AO3
Justify your decisions	Make a case for the decisions/ actions taken explaining why they particularly meet the particular circumstances/ context	AO3
Describe the effect of (e.g. an event)…. **Describe** the effect on …..…	write about what has changed/happened because of the e.g. event	AO2/AO3
Evaluate	Make an analysis about the success/ quality of e.g. end product/outcome – usually systematic, proposing improvements	AO3

How the application of command verbs in questions works in practise

AO1 (a) Demonstrate knowledge-all AOs require the ability to recall knowledge. AO1a) refers to instances where the learner is simply required to demonstrate basic recall (10% weighting)

AO1 (b) Demonstrate understanding- The ability to explain principles and concepts beyond recall (22% weighting)

AO2 Apply knowledge and understanding to different situations and context (46% weighting)

AO3 Analyse and evaluate information and issues (22% weighting)

- Short, lower-tariff (marks) question types, 'state, list'-type, recall questions typically require a separate point per mark AO1 (a)
- Medium- tariff (marks) question types, 'explain'-type questions may require a point or limited explanation for 1 mark with a further mark available for more depth or explanation AO1 (b)
- Higher tariff 6-12 mark question types, 'discuss'-type questions expect a higher quality of response for higher marks, and these are usually marked using level of response marking (bands)
  AO2 and AO3

Core exam

Assessment objective	Description
AO1 Demonstrate knowledge and understanding	All AOs require the ability to recall knowledge. AO1 refers to instances where the learner is required to demonstrate basic recall. In the test, this helps to give confidence in sufficiency of coverage of the content, and recognises that not all knowledge requires further understanding e.g. terminology, number facts etc. AO1 also covers the ability to explain principles and concepts beyond recall of definitions in order to be able to transfer these principles and concepts between contexts. Learners have built connections between related pieces of knowledge. AO1 therefore also covers the ability of the learners to show understanding by summarising or explaining concepts in their own words, exemplifying, or comparing and making inferences in general terms that show e.g. cause and effect.
AO2 Apply knowledge and understanding to different situations and context	Using and applying knowledge and understanding, of processes, procedures, generalisations, principles and theories to specified, concrete situations. AO2 is about being able to take the understanding of generalities and apply them to specific novel situations. It is more granular than the more extended synthesis/creation that may respond to an analysis of a more holistic complex situation/brief.
AO3 Analyse and evaluate information and issues	Learners will be provided with information e.g. in the form of a detailed / complex scenario, problem or data set. Learners analyse the interrelated issues arising, and where appropriate evaluate the approaches or decisions they may take (for example, the strengths and weaknesses or advantages and disadvantages) to achieve a good solution or outcome. Marks will be given for the quality of analysis and evaluation and the range of factors considered.

(page 22 specification)

Assessment objective	Description	Weighting for theory exam
AO1 a Demonstrate knowledge	The ability to demonstrate basic recall of relevant knowledge in response to straightforward questioning e.g. material properties.	10%
AO1 b Demonstrate understanding	The ability to explain principles and concepts beyond recall of definitions, but in a general way – i.e. out of a particular context in response to straight forward questioning e.g. simple concepts and terms of description in engineering contexts.	22%
AO2 Apply knowledge and understanding to different situations and contexts	Using and applying knowledge and understanding, taking the understanding of generalities and applying them to specific situations. Questions are likely to ask for application in relation to a straightforward situation – e.g. assessing the application of a single concept and the application of essential mathematical concepts.	46%
AO3 Analyse and evaluate information and issues	The ability to analyse the interrelated issues arising from a complex scenario and to evaluate these to propose a best solution or predict impacts etc e.g. – evaluating materials properties and requirements for engineered products.	22%

Assessment objectives in relation to command Verbs and question types

Examples of question types

Core exam

Paper 1

Paper 2

Extended response questions

Section A – Paper 1

17 A company manufactures hard hats from a metal alloy, such as the one shown in Figure 5. The design specifies that the metal should have a crystalline structure. Due to a manufacturing issue, the metal has been produced with an amorphous non-crystalline structure.

Explain how this will affect the performance of the hard hat when it is subjected to an impact.

(4 marks)

Figure 5

Source: www.forestry-suppliers.c

Command verb is **explain**-make clear

Mark Scheme	• In the amorphous metal, the stress cannot be relieved by slippage of planes of atoms [1], as the atoms will be randomly distributed rather than in crystal planes, reducing potential deformation of the hat which means it will absorb less energy [1]. • This will also result in the toughness of the hard hat being lower [1] increasing the risk that the hard hat will break when subjected to an impact [1]. • The hard hat could be subject to high levels of impact damage [1], therefore it would be unsuitable for use [1].	**Marking guidance** 1 mark for each explanation with a further mark for an appropriate expansion of the explanation, up to a maximum of 4 marks. Accept other appropriate answers.
Total marks	4	
AO	AO2 = 4	
Qual spec reference	6.2 – Types of material and their structures	

Section A – Paper 2

3 When managing risks in a manufacturing environment, a hierarchy of control is used. The first step in the hierarchy is elimination of risk.
State the other **four** steps in order of the hierarchy. (1 mark)

Mark Scheme	• Reduction/substitution • Engineering controls to isolate risk • Changing in working methods / administrative controls / training / safe system of work • Personal protective equipment (PPE)	**Marking guidance** 1 mark for all four steps presented in the correct order. Do not accept any other alternative responses.
Total marks	1	
AO	AO1a = 1	
Qual spec reference	12.4.1 – stages of risk assessment	

Command verb is State:

State-give the relevant points briefly

Key words learners need to understand are **four, order** and **hierarchy**

Part B type questions-extended response

What is the key Information

A manufacturing company is considering using a renewable source of power for a new factory. The factory will have a number of electrically-powered machining processes which are expected to operate continuously. The factory is in a high altitude rural location with no nearby river and limited access by road.
Evaluate the different power sources available and **suggest** the most suitable for the needs of this company

(12 marks)

These type of questions are designed for stretch and challenge and provide opportunity for differentiation of learners. **(AO2 & AO3)**

Section B – Paper 1- Extended response questions

A manufacturing company is considering using a **renewable source of power** for a new factory. The factory will have a number of electrically-powered machining processes which are expected to **operate continuously**. The factory is in a **high-altitude rural** location with **no nearby river** and **limited access by road**.

Evaluate the **different** power sources available and **suggest** the **most suitable** for the needs of this company. **(12 marks)**

Command verbs are **evaluate** (Consider several options, ideas) and **suggest** (Give possible reasons)

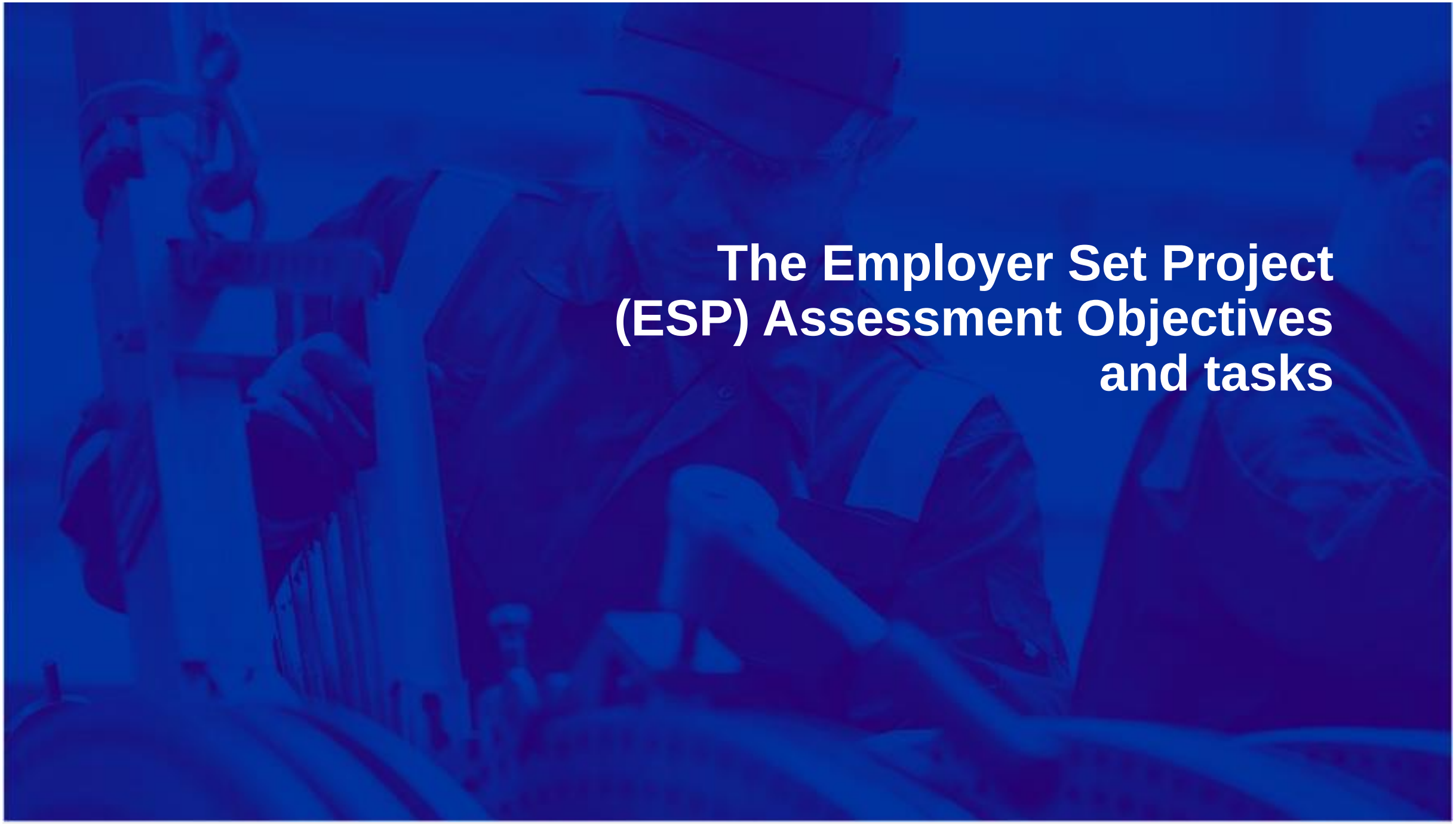
For less able learners you may need to break these types of questions down during formative assessments to support learners in accessing marks

These type of questions are designed for stretch and challenge and provide opportunity for differentiation of learners.

Band	Marks	Descriptor
4	10-12	Demonstrates comprehensive use of analysis of the different types of power sources. Demonstrates comprehensive application of knowledge and understanding of different power sources relevant to the specific requirements of the company. Demonstrates comprehensive evaluative skills, comprehensive reasoning and justifications to which power source would be most suitable. The response is fully coherent and is articulated using a logical structure that maximises understanding.
3	7-9	Demonstrates a thorough use of analysis of the different types of power sources. Demonstrates thorough application of knowledge and understanding of different power sources relevant to the specific company. Demonstrates thorough evaluative skills with thorough reasoning and justifications to which power source would be most suitable. The response is clearly expressed and is well-structured.
2	4-6	Demonstrates a good use of analysis of the different types of power sources. Demonstrates good application of knowledge and understanding of the use of different power sources relevant to the specific company. Demonstrates good evaluative skills with clear reasoning to which power source would be most suitable. The response is generally clearly expressed, with some consideration given to how it is structured.
1	1-3	Demonstrates a basic use of analysis of the different types of power sources. Demonstrates basic application of knowledge and understanding of the use of different power sources relevant to the specific company. Demonstrates basic evaluative skills with limited reasoning to which power source would be most suitable. The response lacks some clarity and is generally poorly structured.
	0	No relevant material

Indicative content

- Solar and wind power are the main options. The limited access and rural location may inhibit the use of biofuels.
- The factory requires continuous operation - solar cells only produce electricity during the day, whereas wind produces energy at night as well.
- Despite recent developments in the storage of solar power, less energy storage may be needed for wind power resulting in lower hardware cost compared to solar energy.
- Space needed – solar power would require significant coverage area facing towards the direction of the sun, whereas with wind power it may be possible to use a single large wind turbine.
- Using a single wind turbine could result in interruption of supply if there are maintenance issues, therefore it may be preferrable to use multiple smaller turbines.
- Solar panels could be installed on the factory's roof, offsetting the space requirement.
- Utilising roof space would reduce impact on local ecosystems.
- Wind power generates more power per unit area than solar power so less land area would be needed.
- High altitude of the factory would contribute to increased wind power.
- The high altitude of the factory would make the use of geothermal power more challenging as greater drilling depths will be required.
- No river near the company excludes the use of hydroelectric power and the rural location excludes the use of wave power, unless extensive cabling was available, which would greatly increase the cost.
- The rural location may mean that animal produced biofuels could be considered, however this would need a substantial quantity in order to be feasible.
- The rural location could mean difficulties in transportation by potential biofuel elements, such as cooking oil, from residential areas.
- Solar power produces DC electricity, whereas the generator in a wind turbine produces AC electricity. Therefore, solar energy would require a DC to AC conversion system to provide mains voltages for the equipment.



The Employer Set Project (ESP) Assessment Objectives and tasks

Assessment Objectives and Weightings-Employer Set project

Design & Development

Employer-set project

Assessment objective	Typical evidence	*Approximate weighting
AO1 Plan approach to meeting the brief	Evidence of a planned approach to work, considered sequence of activity, evidence of prioritisation, review and iterative working. Clearly structured response to brief, cohesive response with ordered sections, logical approach to referencing, research and use of sources, response completed meeting required parameters, sources used effectively and integrated into response, effective use of time allocation available for presentations.	13%
AO2 Apply core knowledge and skills as appropriate	Linking knowledge principles and ideas and applying them in context of the brief when considering compiling response use of materials, concepts etc. Applying core skills e.g. communication, planning etc appropriately throughout tasks within project.	50%
AO3 Select relevant techniques and resources to meet the brief	Analysis of key issues, drawing together considerations and considering impacts of elements on each other (not just in isolation), consideration and analysis of the reasons for doing things in a particular way.	13%
AO4 Use maths, English and digital skills	Use of correct terminology, abbreviations, units of measurement in context, consideration of audience of brief response (technical versus non-technical wording), use of calculations/diagrams etc appropriately, consideration of the use of ICT and digital methods both in brief response and in evidence presentation.	10%
AO5 Realise project outcome and review how well the outcome meets the brief	Considered analysis and evaluation of project outcome, response conclusion or evaluation, identification of solutions in response to brief problem with evidence of evaluation of other options and reasons for rejection of other options where not appropriate.	13%

*Weightings are rounded to the nearest whole number

Maintenance Installation & Repair

Employer-set project

Component	Assessment method	Assessment weighting
AO1 Plan approach to meet brief	Evidence of a planned approach to work, considered sequence of activity, evidence of prioritisation, review and iterative working. Clearly structured response to brief, cohesive response with ordered sections, logical approach to referencing, research and use of sources, response completed meeting required parameters, sources used effectively and integrated into response, effective use of time allocation available for presentations.	13.3%
AO2 Apply knowledge and skills to contexts	Linking knowledge principles and ideas and applying them in context of the brief when considering compiling response use of materials, concepts etc. Applying core skills e.g. communication, problem solving appropriately throughout tasks within project.	50%
AO3 Select techniques and resources to meet brief	Analysis of key issues, drawing together considerations and considering impacts of elements on each other (not just in isolation), consideration and analysis of the reasons for doing things in a particular way.	13.3%
AO4 Use maths, English and digital skills	Use of correct terminology, abbreviations, units of measurement in context, consideration of audience of brief response (technical versus non-technical wording), use of calculations/diagrams etc appropriately, consideration of the use of ICT and digital methods both in brief response and in presentation.	10%
AO5 Realise project outcome and evaluate	Considered analysis and evaluation of project outcome, response conclusion or evaluation, identification of solutions in response to brief problem with evidence of evaluation of other options and reasons for rejection of other options where not appropriate.	13.3%

Assessment Objectives and Weightings-Employer Set project

Engineering Manufacturing Processing & Control

Employer-set project

Component	Assessment method	Assessment weighting
AO1 Plan approach to meet brief	Evidence of a planned approach to work, considered sequence of activity, evidence of prioritisation, review and iterative working. Clearly structured response to brief, cohesive response with ordered sections, logical approach to referencing, research and use of sources, response completed meeting required parameters, sources used effectively and integrated into response, effective use of time allocation available for presentations.	13.3%
AO2 Apply knowledge and skills to contexts	Linking knowledge principles and ideas and applying them in context of the brief when considering compiling response use of materials, concepts etc. Applying core skills e.g. communication, problem solving appropriately throughout tasks within project.	50%
AO3 Select techniques and resources to meet brief	Analysis of key issues, drawing together considerations and considering impacts of elements on each other (not just in isolation), consideration and analysis of the reasons for doing things in a particular way.	13.3%
AO4 Use maths, English and digital skills	Use of correct terminology, abbreviations, units of measurement in context, consideration of audience of brief response (technical versus non-technical wording), use of calculations/diagrams etc appropriately, consideration of the use of ICT and digital methods both in brief response and in presentation.	10%
AO5 Realise project outcome and review how well the outcome meets the brief	Considered analysis and evaluation of project outcome, response conclusion or evaluation, identification of solutions in response to brief problem with evidence of evaluation of other options and reasons for rejection of other options where not appropriate.	13.3%

High level overview of the ESP tasks

Design & Development

Task		Conditions	Evidence produced	Evidence submitted?	Timings	Marks available
1	Research	Supervised/ controlled	Technical brief, research notes, list of references/sources	Yes	3 hours	15
2	Design	Supervised/ controlled	Sketches and drawings, calculations	Yes	8 hours	24
3	Plan	Supervised/ controlled	Programme of work, supporting statement	Yes	5 hours	18
4	Present	Supervised/ controlled	Presentation materials (slides, handouts, notes etc), video recording of observation	Yes	2.5 hours	24
				Total	18.5 hours	81
				Maths, English and digital skills*		9
				Total marks		90

*10% of the marks (i.e. 9 marks) allocated to maths, English and digital skills across all tasks.

Maintenance Installation & Repair

Task		Conditions	Evidence produced	Evidence submitted?	Timings	Marks available
1	Research	Supervised/ controlled	Technical brief, research notes, list of references/sources	Yes	3 hours	15
2	Report	Supervised/ controlled	Written report, drawings	Yes	4 hours	24
3	Plan	Supervised/ controlled	Planning chart, supporting statement	Yes	3 hours	18
4	Present	Supervised/ controlled	Presentation materials (slides, handouts etc), video recording of presentation	Yes	2.5 hours	24
				Total	12.5 hours	81
				Maths, English and digital skills*		9
				Total marks		90

*10% of the marks (i.e. 9 marks) allocated to maths, English and digital skills across all tasks.

High level overview of the ESP tasks

Engineering Manufacturing Processing & Control

Task		Conditions	Evidence produced	Evidence submitted?	Timings	Marks available
1	Research	Supervised/ controlled	Research notes, list of references /sources	Yes	3 hours	15
2	Report	Supervised/ controlled	Written report	Yes	4 hours	18
3	Design	Supervised/ controlled	Assembly drawings, design calculations	Yes	6 hours	24
4	Present	Supervised/ controlled	Presentation materials (slides, handouts etc.), video recording of presentation	Yes	2.5 hours	24
				Total	15.5 hours	81
					Maths, English and digital skills*	9
					Total marks	90

Hints and Tips (pre-delivery)

- Have an infographic of all the command verbs- introduce these as soon as possible
- Let learners know when exams are-highlight which sessions you will be going through exam preparation
- Bring as much practical as possible by interactive sessions, quizzes, kahoot, etc preparing presentations
- Use mnemonics for processes and legislation
- Practice the ESP tasks –research, note taking, drafting an email, presentation skills, working in small groups
- Share with learners what they will be assessed on, show learners the marking grids and use sample support resources

How we support you

Updates/Topics/Networks

Blended approach to communication

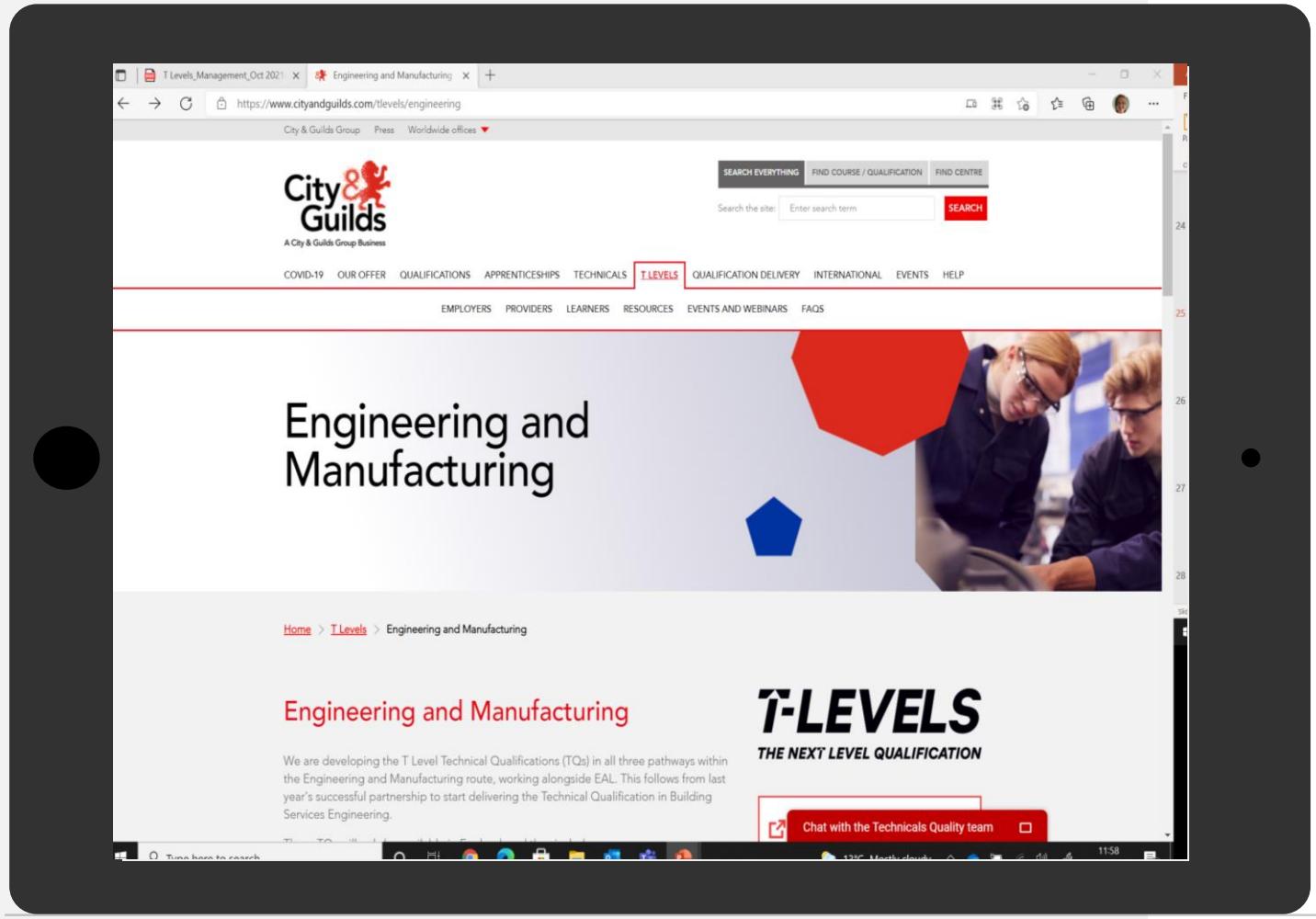
Provider networks and events

e-bulletin content and email updates

Website

Support and Guidance

Ready to support eligible providers and stakeholder engagement



https://www.cityandguilds.com/tlevels/providers

- Timeline
- Provider focus groups
- Employer Industry Boards
- e-bulletins
- Specification
- Resource Hub https://www.cityandguilds.com/tlevels/resources
- Learner flyer t-levels-learner-flyer-engineering-and-manufacturing
- Dedicated Technical Advisors

Events & Webinars

- Resource development for the core
- Teaching & Learning support for exam component
- Face-to-face events
- Events, networks and webinars are located on our T Level Home page here under the accordion Engineering & Manufacturing. Here you will also find copies of the slide decks presented in the events, networks and webinars.
- Recorded webinars on our dedicated Engineering Go To Webinar Channel here.
- For the most up to date information regarding future events please register for our T Level e-bulleting at the bottom of this webpage, here.

Next Event:

(**03.02.23**, 15.00-16.00 GMT) Preparing for Core Assessments Q&A (Part 2) via MS Teams

Websites to Support Providers

T Level Industry Placement Delivery Guidance
T Level industry placements delivery guidance - GOV.UK (www.gov.uk)

Introduction to T levels
T levels - GOV.UK (www.gov.uk)

How T Levels are funded
How T Levels are funded - GOV.UK (www.gov.uk)

T Levels capital fund
T Levels capital fund - GOV.UK (www.gov.uk)

T Levels resources for teachers and careers advisers
T Levels resources for teachers and careers advisers - GOV.UK (www.gov.uk)

T Levels: next steps for providers
T Levels: next steps for providers - GOV.UK (www.gov.uk)

Supporting with delivering T Levels
Support with delivering T Levels

T Level Transition Programme Framework for 2022 – 2023
T Level Transition Programme Framework for Delivery 2022 to 2023 - GOV.UK (www.gov.uk)

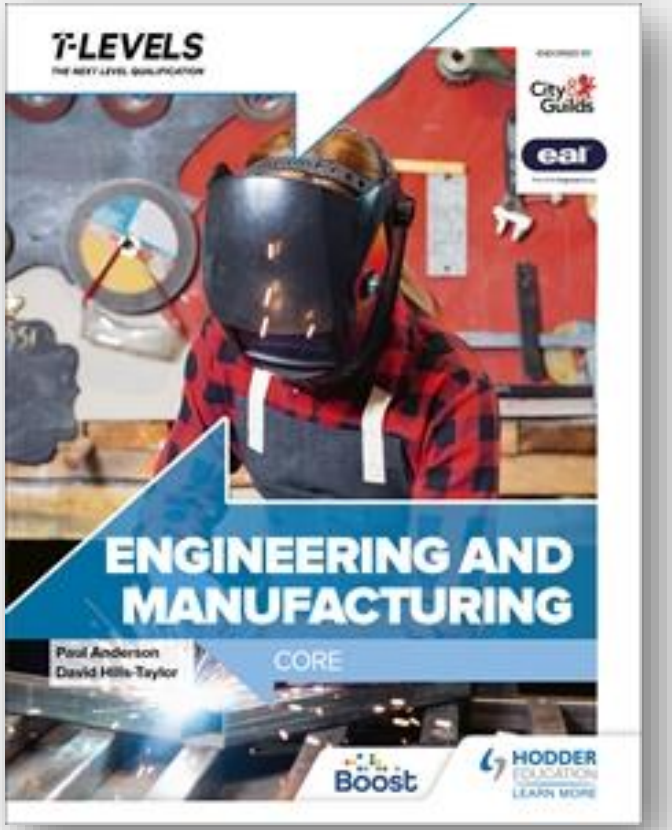
ETF Foundation – T Levels
T Level Professional Development - Education & Training Foundation (et-foundation.co.uk)

COMING SOON!

Engineering and Manufacturing T Level: Core Textbook

Tackle the core component of your Engineering and Manufacturing T-Level head on with this comprehensive textbook published in association with City & Guilds.

- Complete coverage of the T Level's core component
- Prepares students for core exams and ESP
- Publishing June 2023
- Available in print and digital formats
- Print: 9781398360921 // £34
- Boost eBook: 9781398361058// £11 per year
- From expert authors Paul Anderson and David Hills-Taylor



Contact Gemma Simpson to receive an advance sample chapter:
gemma.Simpson@hoddereducation.co.uk

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Visit www.hoddereducation.co.uk/t-levels

T Level Associate Vacancies

Would you like to be involved with supporting the delivery of T-Levels?

- **Principal Moderators / Moderators**

Ensure a standardised and consistent approach to quality assurance, moderation, feedback and processes

- **Technical Qualification Associates (TQAs)**

Review Eligible Provider approval applications, including supplementary evidence and carry out approval and support activities.

- **Chief/Principal Examiners**

Produce and submit assessment materials and participate in all stages of the production process until sign off.

- **Marking Examiners**

Mark candidates' scripts/evidence in accordance with the agreed marking scheme/criteria within the agreed timescale

For further information, please contact Samantha.Ashman@cityandguilds.com or visit our website on the attached link: Associate Vacancies | City & Guilds Group Careers