Welcome to the T Level Engineering and Manufacturing

The webinar will begin shortly

Rob Stott - City & Guilds Industry Manager

Mike Scarrott - Product Specialist

Agenda

1. Background and purpose of today's meeting
2. What are T Levels
3. Pathway breakdown / content
4. Milestones / Delivery model
5. Sample questions
6. Employer engagement (EIB and T Levels)
7. Questions

Welcome – Industry Team for Engineering & Manufacturing

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Background and purpose of today's meeting

- In October C&G won 3 contracts to develop the E&M TQs in D&D, MIR and MPC, in partnership with EAL – 5 year contract.
- Since October we have been working to amplify the outline content, work out the Guided Learning Hours (GLH) and in doing so have come across a number of challenges.
- Eligible providers must be approved by DfE in the first instance.
- Each TQ is based on content developed by an employer panel.
- The Institute are the certificating authority and own the IP not the AO.
- The winning AO is the development and assessment partner and do not produce a certificate for the learner.
- T Levels are a programme not a qualification.
- Feedback and validation from providers and employers (be it positive or negative) is a key part of this development and as part of our contract we are asked to provide the Institute, Ofqual and the DfE with evidence of the feedback and action taken as a result

What are T Levels?

T Levels

Apprenticeships

A Levels

T Levels will become **1 of 3** major options when a student reaches Level 3

Key principles

To ensure the skills system responds to the changing labour market, employers, providers and other partners need to be involved in both design and delivery.

Co-creation: shaping occupational standards and designing wider T Level content.

Co-delivery: employers offering industry placements to T Level students so they can apply the knowledge and skills they have learnt in college.

The Structure of T Levels

T Level qualification

- *Approximately 1,800 hours over two years*
- *Learners will need to achieve all elements to receive their T Level certificate.*
- *Subject content is set by T Level employer panels, developed by Awarding Organisations (AOs), and approved by the Institute for Apprenticeships & Technical Education ("the Institute"). The Institute then oversees the delivery of the qualifications to providers by AOs.*

Technical Qualification (TQ)

Between 900-1400 hours / Undertaken in a college- / school-based setting

Core Component

- Knowledge and understanding of the concepts, theories and principles relevant to the T Level and the broader route.
- Core skills relevant to the T Level.
- *Assessed through an external examination, and a substantial employer set project (ESP) undertaken in the classroom setting and set by Awarding Organisation (AO) employer panels.*

Occupational Specialism(s)

- Knowledge, skills and behaviours required to achieve threshold competence in an occupational specialism.
- Maths, English and digital skills are included where necessary to achieve threshold competence.
- Students must complete at least one occupational specialism.
- *Assessed synoptically through rigorous practical assignments.*

T Level Industry Placement

- Undertaken in an employer setting.
- Minimum of 45 days, *between 315-420 hours*.
- Students develop technical skills and apply their knowledge in a workplace environment.
- Provider should pay / contribute to travel and subsistence costs, if not covered by the employer.
- Employers are not expected to pay students.

Other Requirements

- T Level panels may set occupation-specific requirements, if they are essential for skilled employment, e.g. a licence to practice qualification or professional qualification.

Employability, Enrichment & Pastoral Requirements

How do T Levels compare?

A LEVELS

Subject-based qualifications

two years
at local college or school

T LEVELS

2-year technical programmes at
Local colleges, schools, training providers
80% classroom based
20% in a placement

Includes **Industry Placements**
to build attitudes and behaviours
and to develop practical skills

APPRENTICESHIP Level 2/3

at least 12 months work-based training

80% on the job
20% off the job

Followed by possible progression to :

Higher Education

Skilled Employment

Higher/Degree Apprenticeship

T Level programme composition

1400-1800 GLH hours over two years. Achievement of T Level must include all components. UCAS points will be attached and will be equivalent to 3 A levels.

CORE
50% Total TQ time
Graded A* - E

Paper 1 Maths & Science
Paper 2 Engineering Concepts
3 ESP

Assessment:
- External set and marked exams

OCCUPATIONAL SPECIALISM
50% Total TQ time
Graded Pass/merit/distinction

Based on occupational maps
No less than 50% of the total qualification planned time

Assessment:
- practical assignment(s)

WORK PLACEMENT
315-420 hours
Min 45-60 days

Maths, English and digital skills
GCSE or Functional Skills Level 2

Enrichment – tutorial

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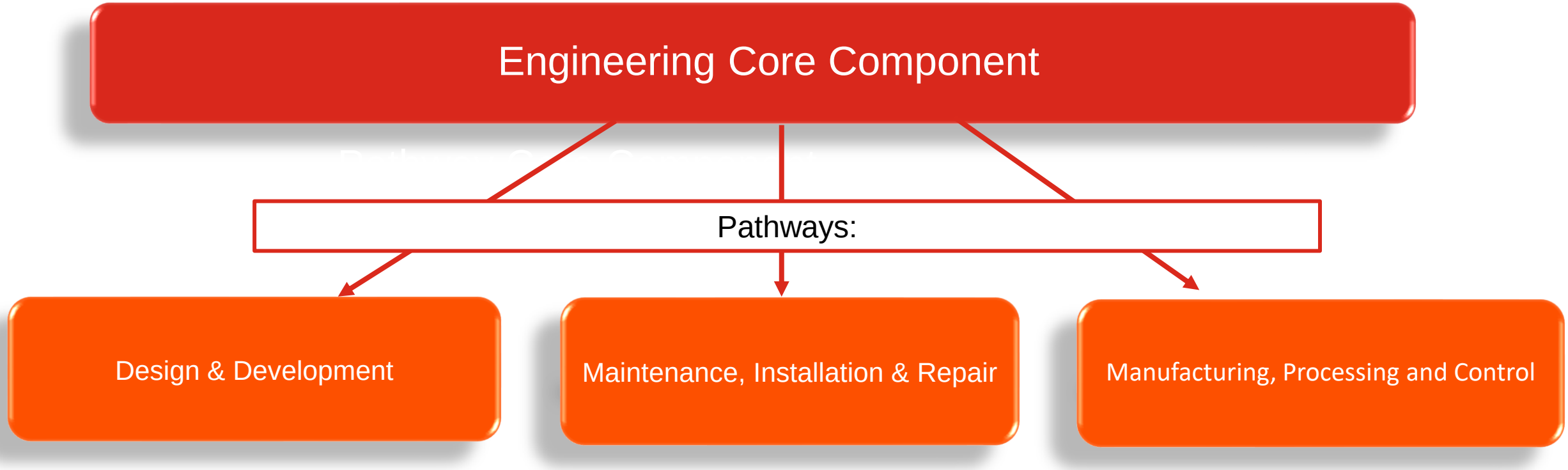
Technical Qualification overview for Engineering:



Learners must complete:

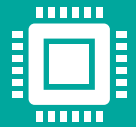
- Engineering Core
- 1 Occupational specialism within a pathway

PATHWAY - Design and Development

Occupational Specialisms

Mechanical Engineering

Electrical & Electronic Engineering

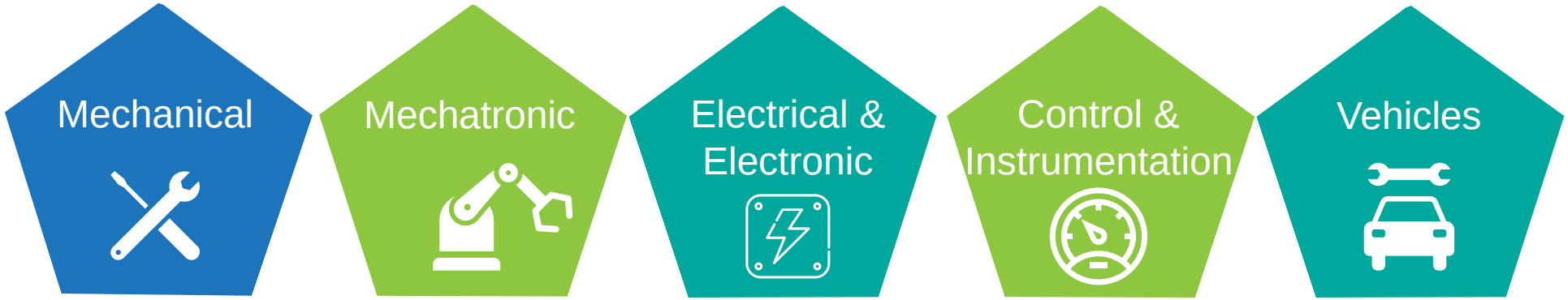


Control & Instrumentation Engineering

Structural Engineering

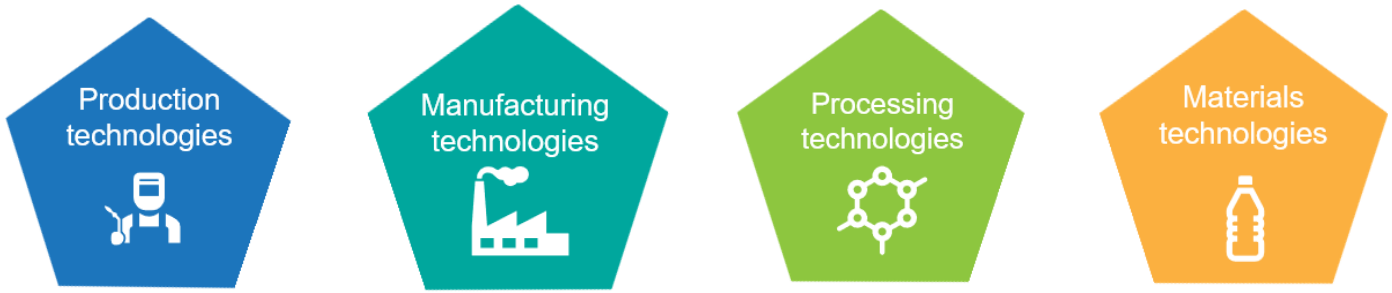
PATHWAY - Maintenance, Installation and Repair

Occupational Specialisms



PATHWAY - Manufacturing, Processing and Control

Original Occupational specialisms



Proposed New Occupational Specialisms

Guided Learning Hours

New Proposal for Core and OS content

Engineering and Manufacturing					
Design and Development		Maintenance, Installation and Repair		Manufacturing, Processing and Control	
Core Content (GLH)	**Occupational Specialism (GLH)**	**Core Content (GLH)**	**Occupational Specialism (GLH)**	**Core Content (GLH)**	**Occupational Specialism (GLH)**
600	600	600	600	600	600
1200		1200		1200	

- To put this into context:
  - 3 x A Levels = 1080 hours

Guided Learning Hours: Sequence of Delivery

Assessment in series						
		Winter Series		Spring Series		Summer Series
Year 1	Term 1	Christmas	Term 2	Easter	Term 3	Summer
Delivery	Core		Core		Core	
Placement	Core		Placement		Placement	
Assessment					ESP Window	Core exams
Year 2	Term 1	Christmas	Term 2	Easter	Term 3	Summer
Delivery	OS		OS			
Placement	Placement		Placement			
Assessment	ESP Window resit	Core Exams resit		OS assignment		

- Feasible delivery
- Space for resit opportunities
- Guided learning hours rationalised
- To deliver the programme in the 2 year window the assessments will need to be approximately sequenced in this way.

Exemplar Specifications

To achieve the **T Level Technical Qualification in Engineering and Manufacturing: Maintenance, Installation and Repair (Level 3) (delivered by City & Guilds)** learners must complete the **three** components of the Technical qualification. These are known as the core component and the occupational specialism:

- (300) plus one from (311 – 316)

T Level Technical Qualification in Engineering and Manufacturing: Maintenance, Installation and Repair (Level 3)			
City & Guilds component number	**Component title**	**Component level**	**GLH**
Mandatory			
300	Engineering common core	3	720
Choose one standalone occupational specialism			
Standalone			
311	Maintenance engineering technologies: Mechanical	3	520
312	Maintenance engineering technologies: Mechatronic	3	570
313	Maintenance engineering technologies: Electrical and Electronic	3	520
314	Maintenance engineering technologies: Control and Instrumentation	3	360
315	Vehicles	3	340
316	Energy and Utilities Technologies	3	570

Technical qualification scheme of assessment overview

Core Component – Learners must complete **all** assessment components						
Assessment component	**Method**	**Duration**	**Marks**	**Weighting**	**Marking**	**Grading**
Exam paper 1	Externally set exam	2 hours	102	35%	Externally marked	This component will be awarded on the grade scale A* - E
Exam paper 2	Externally set exam	2 hours	102	35%	Externally marked	
Employer-set project	Externally set project	21 hours	100	30%	Externally marked	
Occupational Specialism Component - Learners must complete **one** assessment component						
Assessment component	**Method**	**Duration**	**Marks**	**Weighting**	**Marking**	**Grading**
Maintenance engineering technologies: Mechanical	Externally set assignment	tbc	tbc	tbc	Externally moderated	All occupational specialism components will be awarded on the grade scale P, M, D
Maintenance engineering technologies: Mechatronic	Externally set assignment	tbc	tbc	tbc	Externally moderated	
Maintenance engineering technologies: Electrical and Electronic	Externally set assignment	tbc	tbc	tbc	Externally moderated	
Maintenance engineering technologies: Control and Instrumentation	Externally set assignment	tbc	tbc	tbc	Externally moderated	
Vehicles	Externally set assignment	tbc	tbc	tbc	Externally moderated	
Energy and Utilities Technologies	Externally set assignment	tbc	tbc	tbc	Externally moderated	

T-LEVELS

Exemplar Core Examinations Paper 1 & 2

Paper 1 (Maths & Science)

Q1

The input into a gearbox is 300 revolutions per minute (rpm). The output from the gearbox is 2700 rpm. The gearbox contains two gears.

(a) Calculate the ratio of the input speed to the output speed. (1 mark)

(b) The output gear has 18 teeth. How many teeth will the input gear have? (1 mark)

Q1	Mark Scheme (a) 1:9 [1] - Do not accept marks for 9:1 (b) 9 × 18 = 162 teeth [1]
Total marks	2
AO	AO2 = 1 + 1
Qual spec reference	4.1

Paper 2 (Engineering concepts)

(b) The company currently inspects every machined part to ensure that it meets the requirements. Explain **three** potential implications for the company changing from 100% inspection to statistical process control for every machined part. (6 marks)

Q1 (b)	Mark Scheme One mark per implication and one mark per explanation of the implication to the company, up to a maximum of six marks. • Statistical Process Control takes less time and money to carry out (AO2) this could increase the profitability of the production for the company (AO3) • SPC could allow for immediate process adjustments to identified issues by operators (AO2) this would result in fewer parts being produced and scrapped for faults reducing the cost per machine part (AO3) • There is a statistical risk that defects would not be detected without 100% inspection compounding quality issues through the manufacturing stages (AO2) this could result in reputational damage and reduce sales where quality is important (AO3) Credit other suitable responses.
Total marks	6
AO	AO2 = 3 AO3 = 3
Qual spec reference	11.1

Exemplar Employer Set Project

Design specification

Performance requirements for the bollard

Train Express Limited wish to develop a bespoke bollard to be sited in public realm spaces outside their stations across the UK (refer to Photograph 1). The company wish to 're-engineer' the standard self-righting internally illuminated bollard (refer to Photograph 2) used frequently in streetscapes across the UK. The new bollard is also required to monitor the number of people using a station and should be energy efficient. The specific performance requirements of the bollard are:

- The bollard shall have an overall height of 1000 mm and width of 300mm.
- Each bollard needs to be able to sustain an impact loading from a vehicle. The force applied to the barrier should be calculated in accordance with BS EN 1991-1-1:2002 (refer to Table 1).
- The bollard is to be manufactured from a recycled or sustainable material.
- The bollard is to be fitted with technology that is able to count human presence.
- The bollard is to be lit by a low energy lighting source.
- The bollard is to have an internal light source like the original, which ensures that it is highly conspicuous from all sides.
- The overall aesthetic design of the bollard is to be modern and reflect the intended siting outside a railway station.
- The bollard shell should be able to withstand a minor vehicle impact and be easily replaceable.
- Train Express Limited wish to limit or eliminate any mains power source to the bollard.
- The bollard should be designed as far as possible to be vandal proof.

Table 1: Loading applied to the bollard

The horizontal characteristic force F (in KN) should be equal to that delivered by the impact of a vehicle given by: $$F = \frac{0.5\, m\, v^2}{\partial c + \partial b}$$ Where: m is the gross mass of the vehicle in (kg) v is the velocity of the vehicle (in m/s) normal to the barrier. ∂c is the deformation of the vehicle (in mm) ∂b is the deformation of the bollard (in mm)

Photographs

Photograph 1: Typical area outside a Train Express Limited Station

(Source of image: Shutterstock)

T-LEVELS

T Level Progression Routes – current thinking

ROUTE: ENGINEERING and MANUFACTURING			
Pathway	**Occupational Specialism**	**Apprenticeship or Higher Ed**	**Level**
Design & Development	Mechanical Engineering	Engineering Design & Draughtsperson BEng (Hons) Mechanical Engineering (Foundation Year) BEng (Hons) Mechanical Engineering BEng (Hons) Aerospace Technology	Level 3 Level 5 Level 6 Level 6
	Electrical & Electronic Engineering	Engineering Design & Draughtsperson BEng (Hons) Electrical/Electronic Engineering (Foundation Year) BEng (Hons) Electrical/Electronic Engineering	Level 3 Level 5 Level 6
	Control & Instrumentation Engineering	Engineering Design & Draughtsperson Automation & Controls Engineering Technician	Level 3 Level 4
	Structural Engineering	Engineering Design & Draughtsperson Engineer Surveyor BEng (Hons) Civil Engineering (Foundation Year) BEng (Hons) Civil Engineering	Level 3 Level 4 Level 5 Level 6

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T Level Progression Routes – current thinking

ROUTE: ENGINEERING and MANUFACTURING

Pathway	Occupational Specialism	Apprenticeship or Higher Ed	Level
Maintenance, Installation & Repair	Mechanical	Maintenance & Operations Engineering Technician (MOET)	Level 3
	Mechatronic	Lift & Escalator Electro mechanic Engineering Technician Automation & Controls Engineering Technician	Level 3 Level 3 Level 4
	Electrical & Electronic	Maintenance & Operations Engineering Technician (MOET)	Level 3
	Control & Instrumentation	Automation & Controls Engineering Technician	Level 4
	Vehicle	Vehicle damage mechanical, electrical and trim (MET) Technician Accident Repair Technician Motor Vehicle Service & Maintenance Technician (Light Vehicle)	Level 3 Level 3 Level 3

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T-LEVELS

T Level Progression Routes – current thinking

ROUTE: ENGINEERING and MANUFACTURING			
Pathway	**Occupational Specialism**	**Apprenticeship or Higher Ed**	**Level**
Manufacturing, Processing & Control	Fabrication and Welding	Metal Fabricator Plate/Pipe Welder Non-Destructive Testing Engineering Technician	Level 3 Level 3 Level 3
	Composites Manufacturing	Engineering Technician Engineering Manufacturing Technician	Level 3 Level 4
	Production Fitting & Assembly	Engineering Fitter Engineering Technician	Level 3 Level 3
	Machining & Toolmaking	Engineering Technician	Level 3

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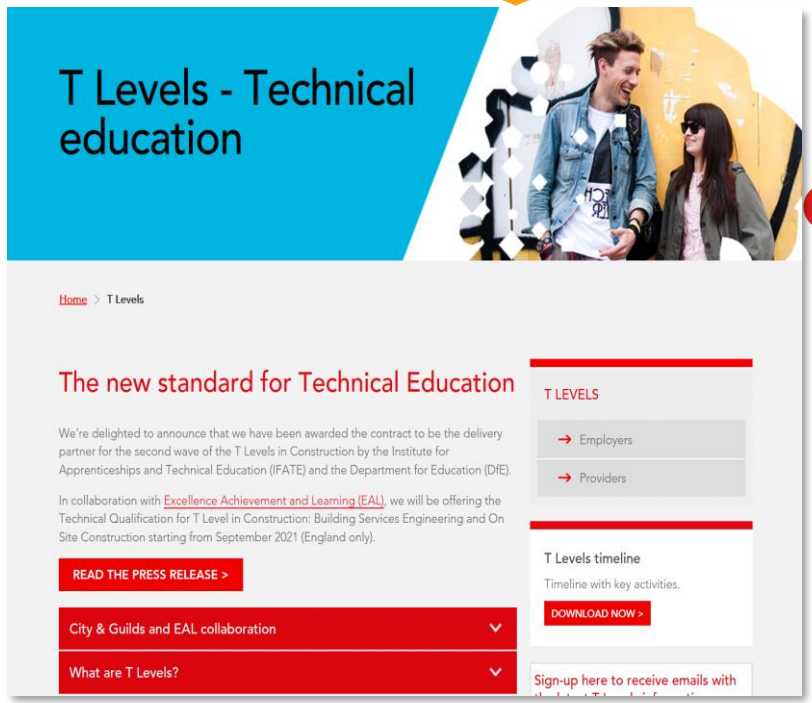
T-LEVELS

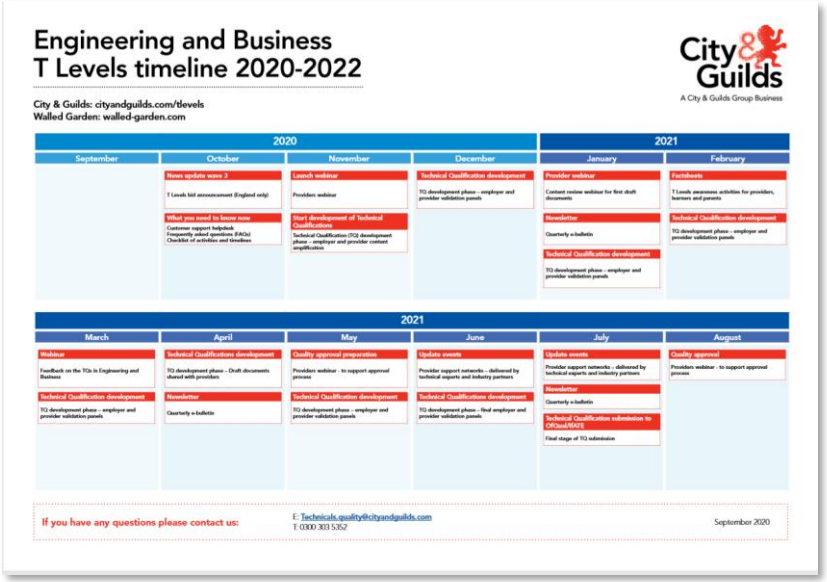
Support and Guidance

Ready to Support eligible providers and stakeholder engagement

- New Webpages for T Levels
- Timelines
- Webinar for eligible providers
- Provider focus groups
- Employer Industry Boards
- E-bulletins
- Draft specification
- Dedicated technical advisors

City & Guilds: cityandguilds.com/tlevels/engineering
EAL: eal.org.uk/T-Levels





Get Involved - Make a difference

- **Employer Industry Board (EIB)**

We have a quarterly meeting with all panel members to discuss industry matters. Some of these can include; apprenticeships, FE, HE, T Levels, new developments (standards, qualifications), new technology AOB

- **T Level Project**

It is critical for the success of T levels that we ensure the TQ is fit for purpose, aligns to employer needs and allows a young person to make informed choices about their future.

We have regular meetings to review key documentation for the T Levels. These can include; specifications, exams, specialist content. Sessions are skill specific and generally for 1 hr.

- **You can get involved in**: Writing content, Developing assessment materials , Reviewing , Validation

- Composite experts please get in touch Robert.stott@cityandguilds

T-LEVELS

Any questions

Please complete the feedback form

Thank you!

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