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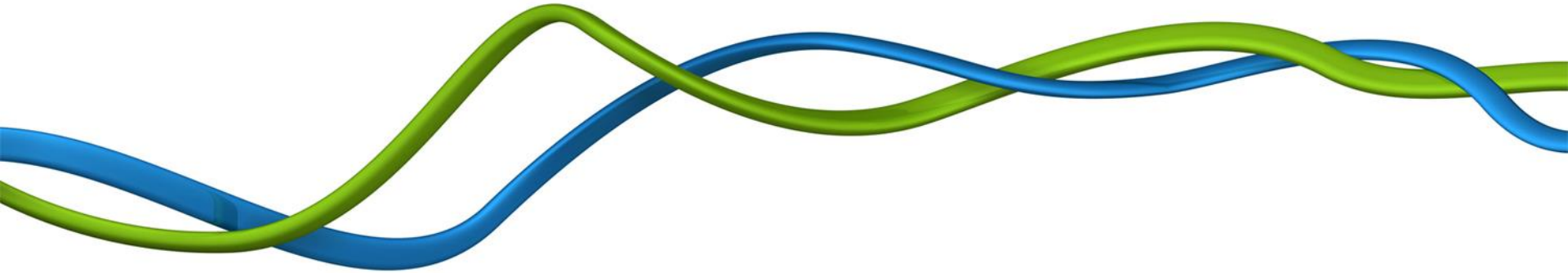
What should all engineering technicians know and do?

The development of T level core content

Dr Rhys Morgan
Director, Engineering and Education
Royal Academy of Engineering



Overview

- Engineering community review of T level content
- Occupational maps for engineering
- Principles of an engineering and manufacturing T level
- Development of core content

Engineering input

- Academy involved in occupational mapping exercise
- Asked by DfE and Lord Sainsbury (Gatsby Charitable Trust) to convene engineering profession
- Wide stakeholder engagement: 40+ organisations engaged through the process of workshops since July
- Sector skills organisations, professional institutions, employer representatives, FE colleges, national skills academies…

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Occupational Routes

15 occupational routes

Agriculture, environment & animal care

Business and Administration

Catering and Hospitality

Childcare and education

Construction

Creative and Design

Digital

Engineering & manufacturing

Hair and Beauty

Health and Science

Legal, Finance and Accounting

Protective Services

Sales, Marketing & Procurement

Social Care

Transport and Logistics

Occupational maps

Route

Engineering & Manufacturing

180+ occupations:

- Apprenticeship standards
- Standards in development
- Other technician occupations

Occupational maps

Route	Pathways
Engineering & Manufacturing	Engineering Design & Development
	Manufacturing & Process
	Maintenance, installation & repair

Occupational maps

Route	Pathways	Specialisms
Engineering & Manufacturing	Engineering Design & Development	Engineering design and development technician
		Quality and project control technician
	Manufacturing & Process	Fabrication and machining technician
		Manufacturing technician
		Plant operative
		Process operative
		Manufacturing operative
	Maintenance, installation & repair	Installation and service technician
		Manufacturing/ process maintenance technician
		Vehicle technician

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Specialisms

Fabrication & Welding Operative/Technician	Welder (2)
	Engineering technician (3): Maritime fabricator
	Welder (3)
	Engineering construction pipefitter (3)
	Fabrication welder
Manufacturing & Process Operative/Technician	Composites Technician
	Engineering technician (3): Aerospace manufacturing fitter
	Boat builder (3)
	Engineering technician (3): Maritime electrical fitter
	Engineering technician (3): Maritime mechanical fitter
	Engineering technician (3): Maritime pipeworker
	Nuclear operative (2): Nuclear process operative
	Advanced manufacturing fitter
	Heritage engineering technician
	Furniture manufacturer (2): Wood machinist

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Principles of E&M T level

Principle of E&M T levels

- **Not a competency** qualification – should provide a basis for further development towards the competence required in work
- Develop the **widely applicable** knowledge, skills and behaviours that prepare learners for work in a range of different roles
- Motivate and **enable learners to continue their development** by way of apprenticeships, further education or higher education
- Enable **professional registration** – at a later date
- Illustrate the diversity, challenge and career potential of E&M.

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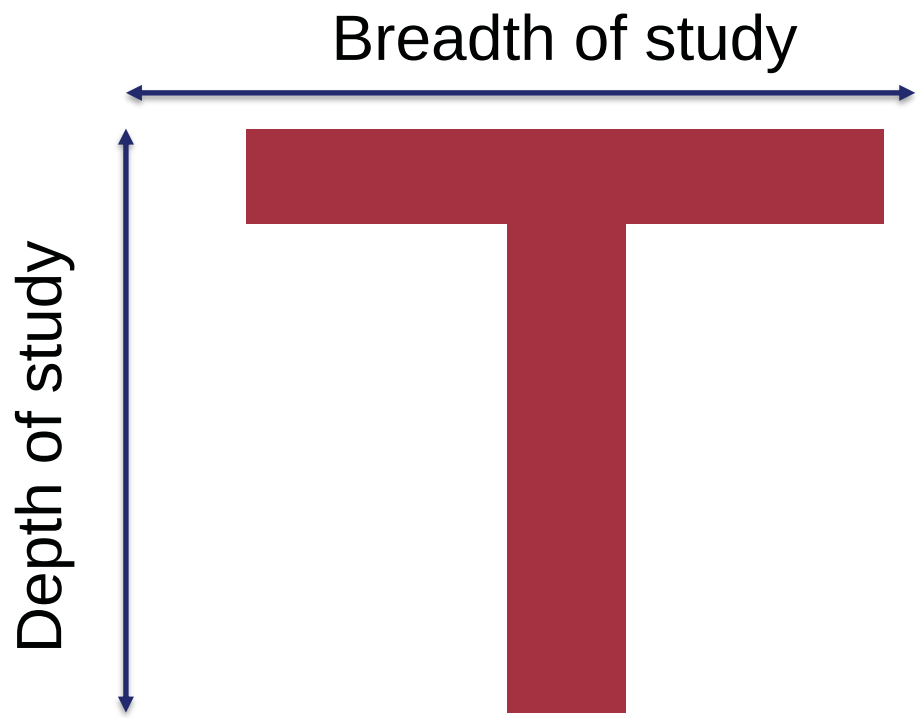
What shape T level?



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What shape T level?

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So what should technicians know and do?

Evolving policy landscape!

Levels

- There will be **no QCF levels** for the qualification - Level differentiation will be through specialisms

Content

- The curriculum must only be the content (knowledge, skills, behaviours) required that enables a person to gain employment in that occupation

Maths

- the only maths content will be that which is common across the pathway and the minimum required to do the job

Duration

- 960GLH – 700hrs Core and specialism,
  260 Basic & additional

UK SPEC Output standards

The Output Standards identify Learning Objectives within each of the following six key areas of learning:

A. Science and mathematics

B. Engineering analysis

C. Design

D. Economic, legal, social, ethical and environmental context

E. Engineering practice

F. Additional general skills

Developing core content

A. Science and mathematics

Outcome A1
Know and explain the scientific principles underpinning relevant technologies and use the main relevant formulae associated with them

Outcome A2
Know and use relevant mathematics, including numerical and data analysis, to support the application of technical and practical skills

Developing core content

B. Engineering Analysis

Outcome B1
Know and explain the standard tests and measurements relevant to engineering and manufacturing, and their limitations

Outcome B2
Know and explain how results of engineering analysis are used to develop solutions to common and well-defined engineering and manufacturing problems

Outcome B3
Know and explain how solutions are applied to common and well-defined engineering and manufacturing problems using commonly applied methods

Developing core content

C. Design

Outcome C1
Know and explain business, customer, and user needs

Outcome C2
Know and explain the constraints on the design process including environmental and sustainability limitations; ethical, health, safety, security and risk issues; intellectual property; codes of practice and standards

Outcome C3
Know and explain how solutions are designed for well-defined engineering and manufacturing problems

Outcome C4
Know their role in the design process

Outcome C5
Be able to communicate their work to technical and non-technical audiences

Developing core content

D. Economic, social, legal, ethical, environmental context

Outcome D1
Know and explain the need to work professionally and ethically and have a basic knowledge of professional codes of conducts

Outcome D2
Know and explain the commercial, economic and social context of the engineering and manufacturing processes

Outcome D3
Know and explain the need for engineering and manufacturing activities to promote sustainable development

Outcome D4
Know the main legal requirements governing engineering and manufacturing activities, including personnel, health & safety, contracts, intellectual property rights, product safety and liability issues

Outcome D5
Know and explain key risk issues, including health & safety and environmental

Developing core content

E. Engineering Practice

Outcome E1
Demonstrate how to use a range of relevant and commonly used materials, equipment, tools, processes, or products

Outcome E2
Know and explain the procedures and practices for common industry standard operations and processes

Outcome E3
Know how to find information in technical literature and how it is applied

Outcome E4
Identify and know how to use commonly available codes of practice and industry standards

Outcome E5
Identify quality issues and explain the potential for continuous improvement

Outcome E6…

Developing core content

F. Additional general skills

Outcome F1
Demonstrate basic skills in problem solving, communication, information retrieval, working with others and the effective use of general IT facilities

Outcome F2
Explain how to plan self-learning and to improve performance as the foundation for lifelong learning/CPD

Outcome F3
Demonstrate how to plan and carry out a personal programme of work

Outcome F4
Demonstrate how to exercise personal responsibility, as an individual or as a team member

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A bit more detail:

Outcome statements

Outcome statements

A. Science and mathematics

Outcome A1
Know and explain the scientific principles underpinning relevant technologies and use the main relevant formulae associated with them

A1.1	Demonstrate the use of SI units	Range of SI units relevant to engineering
A1.6	Solve problems involving work, energy and power	Work done; Energy; Power; Potential and kinetic energy

Developing core content

B. Engineering Analysis

Outcome B1 Know and explain the standard tests and measurements relevant to engineering and manufacturing, and their limitations		
B1.2	Undertake electronic measurement and testing	Selection, calibration and use; Virtual test instruments and software

Outcome B2 Know and explain how results of engineering analysis are used to develop solutions to common and well-defined engineering and manufacturing problems		
B2.2	Recognise the causes of failure	Ductile and brittle fracture; Fatigue; Heat; Vibration; Corrosion; Components; System; Human

Developing core content

C. Design

Outcome C3 Know and explain how solutions are designed for well-defined engineering and manufacturing problems		
C3.1	Electronic devices and circuits	Build and test combinational & sequential logic circuits, Operational amplifier-based analogue circuits, Computer-based simulation software packages to construct and test the operation of analogue and digital circuits
C3.3	Programmable devices	Applications of programmable devices, system layout of programmable devices, function and interrelationship of components, operational analysis of control systems

Next steps

- Completion of the independent guidance – mid Dec
- Publish - early January 2018
- Meet with DfE T level pathway panels – Jan / Feb

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Thank You

- Rhys.Morgan@raeng.org.uk
- Stylli.Charalampous@raeng.org.uk

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One final plug!

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THIS IS ENGINEERING