

## Smart Tech Qualifications and Information

**For this qualification TLM recommend the excellent teaching resources and support offered by Black Country Atelier.**

Further information can be found [here](#) [1].

**HANDBOOK  
Level 1**

[2]

**Level 1  
Certificate**

[3]

**HANDBOOK  
Level 2**

[2]

**Level 2  
Certificate**

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### Level 1

## Level 1, Unit 1 - Product design and visualisation (5 credits)

**1. relate opportunities and constraints to a product design.**

[1.1 identify opportunities for a product or solution.](#) [5]

[1.2 identify constraints on a product or solution.](#) [8]

[1.3 consider commercial sustainability of a product](#)

**2. visualise product solutions to meet identified needs.**

[2.1 identify key aspects in a design brief.](#) [6]

[2.2 gather information to develop a solution.](#) [9]

[2.3 design and test sketches and models to](#)

**3. present evaluations of designs.**

[3.1 collect evidence for presenting the design.](#) [7]

[3.2 present strengths and weaknesses in a visual prototype.](#) [10]

[3.3 use appropriate digital and/or physical models to](#)

[or solution.](#) [11]

[visualise a solution.](#) [12]

[support presenting a design.](#) [13]

[2.4 use appropriate digital and physical media to design a product.](#) [14]

[3.4 receive feedback from presenting a design.](#) [15]

[2.5 prepare a visual prototype of the solution.](#) [16]

[3.5 act on feedback to improve a design.](#) [17]

## Level 1, Unit 2 - Product manufacture (5 credits)

**1. relate a product's design to its manufacture.**

**2. use tools and information to support the manufacturing process.**

**3. present an evaluation of manufacturing processes.**

[1.1 check quality in a design in preparation for manufacture.](#) [19]

[2.1 select the tools needed for manufacture.](#) [20]

[3.1 collect evidence for presenting the manufacturing process.](#) [21]

[1.2 use scale and dimensions to associate plans with manufacture.](#) [22]

[2.2 prepare information to manufacture a product.](#) [23]

[3.2 present strengths and weaknesses in the manufacturing process.](#) [24]

[1.3 prepare and document files to support the process of moving from design to manufacture.](#) [25]

[2.3 use manufacturing tools with appropriate precision and attention to safety.](#) [26]

[3.3 use appropriate digital and/or physical drawings or models to support a presentation of the manufacturing process.](#) [27]

[1.4 make adjustments to a design as a result of feedback from the manufacturing process.](#) [28]

[2.4 fabricate a product using appropriate materials and settings.](#) [29]

[3.4 receive feedback from presenting the manufacturing process.](#) [30]

[2.5 finish or assemble parts and components.](#) [31]

[3.5 act on feedback to improve work.](#) [32]

[2.6 identify and correct errors to make improvements to work.](#) [33]

## Level 1, Unit 3 - Smart electronics (5 credits)

**1. understand analogue circuits.**

[1.1 identify circuit components and symbols.](#) [35]

[1.2 identify valid circuits.](#) [38]

[1.3 set up a physical analogue circuit for a purpose.](#) [41]

[1.4 distinguish between analogue and digital products.](#) [44]

**2. understand digital control.**

[2.1 identify digital circuit components.](#) [36]

[2.2 identify program elements that control physical components.](#) [39]

[2.3 debug a control program to get it working.](#) [42]

[2.4 use switches to control actions.](#) [45]

**3. combine analogue and digital systems.**

[3.1 identify a trigger point in a changing voltage.](#) [37]

[3.2 follow instructions to build a Smart system.](#) [40]

[3.3 use a program to control a physical system.](#) [43]

[3.4 combine Smart technology in a design to improve the user experience.](#) [46]

**Level 2**

**Level 2, Unit 1 - Product design and visualisation (5 credits)**

**1. relate opportunities and constraints to a product design.**

[1.1 describe opportunities for a product or solution.](#) [48]

[1.2 describe constraints on a product or solution.](#) [51]

[1.3 consider commercial sustainability of a product or solution.](#) [54]

**2. visualise product solutions to meet identified needs.**

[2.1 explain key aspects in a design brief.](#) [49]

[2.2 gather information to develop a solution.](#) [52]

[2.3 design and test sketches and models to visualise a solution.](#) [55]

[2.4 use appropriate digital and physical media to design a product.](#) [57]

**3. present evaluations of designs.**

[3.1 organise evidence for presenting the design.](#) [50]

[3.2 explain strengths and weaknesses in a visual prototype.](#) [53]

[3.3 use appropriate digital and/or physical models to support presenting a design.](#) [56]

[3.4 receive feedback from presenting a design.](#) [58]

[2.5 prepare a visual prototype of the solution.](#) [59]

[3.5 act on feedback to improve a design.](#) [60]

## Level 2, Unit 2 - Product manufacture (5 credits)

**1. relate a product's design to its manufacture.**

[1.1 check quality in a design in preparation for manufacture.](#) [62]

[1.2 work with scales and dimensions when associating plans with manufacture.](#) [65]

[1.3 prepare and document files to support the process of moving from design to manufacture.](#) [68]

[1.4 make adjustments to a design as a result of feedback from the manufacturing process.](#) [71]

**2. use tools and information to support the manufacturing process.**

[2.1 select the tools needed for manufacture.](#) [63]

[2.2 prepare and plan information for the manufacturing a process.](#) [66]

[2.3 use manufacturing tools with appropriate precision and safety.](#) [69]

[2.4 fabricate a product using appropriate materials and settings.](#) [72]

[2.5 finish or assemble parts and components.](#) [74]

[2.6 explain how to correct errors to make improvements to work.](#) [76]

**3. present evaluation of manufacturing processes.**

[3.1 organise evidence for presenting the manufacturing process.](#) [64]

[3.2 explain strengths and weaknesses in the manufacturing process including economic and environmental considerations.](#) [67]

[3.3 use appropriate digital and/or physical models to support a presentation of the manufacturing process.](#) [70]

[3.4 receive feedback from presenting the manufacturing process.](#) [73]

[3.5 act on feedback to improve my work.](#) [75]

## Level 2, Unit 3 - Smart electronics (5 credits)

**1. understand**

**2. understand digital**

**3. combine analogue**

## analogue circuits.

[1.1 describe the purpose of circuit components and symbols.](#) [78]

[1.2 build valid circuits.](#) [81]

[1.3 set up and debug a physical analogue circuit for a purpose.](#) [84]

[1.4 explain the difference between analogue and digital products.](#) [87]

## control.

[2.1 describe the purpose of digital circuit components.](#) [79]

[2.2 create program elements that control physical components.](#) [82]

[2.3 explain bugs in a control program and get it working.](#) [85]

[2.4 use logic to control actions.](#) [88]

## and digital systems.

[3.1 describe the process of analogue to digital conversion.](#) [80]

[3.2 build a Smart system.](#) [83]

[3.3 explain how to use a program to control a physical system.](#) [86]

[3.4 combine Smart technology in a design to improve the user experience.](#) [89]

**Source URL:** [https://theingots.org/community/SMART\\_qualification\\_info\\_units](https://theingots.org/community/SMART_qualification_info_units)

## Links

[1] <http://www.blackcountryatelier.com/>

[2] [https://theingots.org/community/sites/default/files/uploads/user4107/Smart%20Product%20Design\\_Spec\\_L1\\_L2\\_Spec\\_BCA\\_TLM\\_2019-v1.1.pdf](https://theingots.org/community/sites/default/files/uploads/user4107/Smart%20Product%20Design_Spec_L1_L2_Spec_BCA_TLM_2019-v1.1.pdf)

[3] <https://register.ofqual.gov.uk/Detail/Index/34052?category=qualifications&query=TLM%20Level%201%20Certificate%20In%20Smart%20Product%20Design%20and%20Manufacture>

[4] <https://register.ofqual.gov.uk/Detail/Index/34062?category=qualifications&query=TLM%20Level%202%20Certificate%20In%20Smart%20Product%20Design%20and%20Manufacture>

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