

GCE Design and Technology (Product Design)

Course Planner

Accredited Version 1

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# Introduction

From 2017, AS Design Technology will be a standalone qualification; it cannot contribute towards an A level. It equates to half the content of an A level, but the assessment will be at a similar standard to the current AS (and therefore a different standard from A level). It should also be noted that the subject content at AS level is identical to work that has to be covered at A level. Only the AS coursework element would be omitted if taking A level.

Both qualifications will have linear assessment; with all examinations at the end of the course. This de-coupling of AS from A level and the move from modular to linear assessment have implications for planning and delivery which are considered in this course guide, but it will be for centres to decide which approach is the most suitable for their staff and students.

# Which delivery model?

The flowchart below outlines some of the key questions Design and Technology departments will need to consider when planning for the new course. Each level links through to a delivery option on the next few pages where more detail on the advantages and disadvantages is given, and to the relevant course planner models below.

No

Yes

Delivery option 1

Delivery option 2

No

Yes

Delivery option 3

Do you want to co-teach AS and A level students in the same class(es)?

Do you want to offer an AS course as well as an A level course to students?

## Delivery Options

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|  | **Option 1** | **Option 2** | **Option 3** | **Option 4** | **Option 5** |
| *Enrolment* | Students opt for either an AS course or an A level course, with no option to switch later | | Only an A level is offered: all students must undertake the full two- year course. | Students opt for either an AS course or an A level course, but can switch later on. | |
| *Teaching* | AS and A level students are taught separately. | AS and A level students are taught in the same class. | Only A level is taught. | AS and A level students are co-taught in same classes. | |
| *End of year 1* | AS students sit the AS exam.  A level students sit an internal exam on year 1 topics, using A level-style questions. | | Internal exam on year 1 topics, using A level-style questions | All students sit the AS exam. Teaching finishes in time for revision for AS exams. Students decide whether to continue to A level once they have their AS results. | Students to confirm by entry deadline whether they want to continue to A level. Only those not continuing to A level sit the AS exam.  Others sit an internal exam but focusing on A level on year 1 topics, using A level-style questions. |
| *Advantages* | Greater flexibility in ordering of A level topics. Teacher can focus on AS only or A level only. | Not running two separate AS/A courses may be easier for timetabling/more cost effective. Know from the start which students will do A level. | Greater flexibility in structuring the course – can do topics in any order. More time within course, with the exam at the end. | More flexible for students – can leave their decisions until they have AS results. Gain a qualification after first year. Give UCAS an idea of performance. | More flexible for students – can leave their decisions until part- way through the course. |
| *Disadvantages* | May need greater timetabling, staffing flexibility and resources to run two separate courses. | Need to prepare students in one class for different assessments. | Less flexible for students – have to commit to two year course. | Less teaching time in year 1. Less flexibility in structuring course.  A level numbers not confirmed until AS results out.  AS results doesn’t count to A level – students have to be examined on year 1 content twice. | Less flexibility in structuring course – but can start A level content (year 2 material) at end of year 1.  Co-teaching more complicated – preparing only some students for AS exams.  Requires students to decide whether to continue without having AS results. Have to complete. |
| Less flexible for students – requires early decision. | |

# Course Planners

This document provides sample outline course planners for AS and A level that can be adapted by centres to fit their timetabling and staffing arrangements. The planners are offered only as examples and are not intended to be prescriptive. The course planners gives examples of a co-teachable approach as well as an approach which assumes that the A level will not be co-taught with the AS level and broadly follows the order in which the content is set out in the specification. It shows how the topics can be spread over a one or two year course. Centres are encouraged to organise the topics to suit their centre and students.

The planners assume 30 teaching weeks with 4 lessons each weekfor the AS course and 36 teaching weeks (with 4 lessons per week) in each year for the other options, including part of the summer term following the AS examinations.

## Delivery Option 1

### One-year AS model, separate classes, no co-teachability

The content outlined is that which will be examined at the end of the AS course, concluding after 30 weeks**.**

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| **Lesson** | **Autumn 1st half** | | **Autumn 2nd half** | |
| 1 | Topic 1: Materials and Topic 2: Performance Characteristics of Materials   * 1 lesson/ material type * Taught in conjunction with 3.1 Processes and Techniques in Lesson 2. * Smart materials (1.7) taught here or could be a standalone session later. | | 3.4 Joining techniques  3.5 Finishing techniques  5.1 User-centred design  5.2 Ergonomics and Anthropometrics  5.3 Form over Function  Topic 7: Potential hazards and risk assessment  Mock examinations preparation | |
| 2 | 3.1 Processes & Techniques (in conjunction with Lesson 1 Topics 1 and 2). Divided into;   * Metals (a), (b) and (d) * Machining (e) various materials * Wood (g) and (h). * Polymers (f) * Printing (c) * Marking out (i) various materials | | 5.4 History of Design Theory   * One week allocated to each movement (a) – (g) | |
| 3 | Controlled selection of products made available for students to prepare presentations on their chosen products.  Products to be analysed and justification for their materials/manufacture choice and overall design decisions, using the theory knowledge taught in lessons 1 and 2.  Presentation could take place after the start of the new term. | | NEA: Design and develop a product from a provided list of suggested starting points. Range of products reflecting the interest of the students.  Part 1: Identifying opportunities for design   * Research techniques * Specification * Design methodology * Developing designs | |
| 4 | 3.2 Specialist measuring tools and equipment  3.3 Drawing techniques  4.1 Digital technologies (a) Use of CAD | Focused Practical task – suggest choice, one to be a concept model outcome and one to be architecturally focused.  Manufactured from drawings – with minimal design input. | | NEA:  Part 2: Designing a prototype  Part 3: Making a final prototype |

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| **Lesson** | **Spring 1st half** | | | **Spring 2nd half** |
| 1 | 4.1 Digital technologies (b) CAM & rapid prototyping  6.1 Effects of technological developments  (a) Mass production  (b) Industrial age  © Global marketplace | | | Revision time or catch up for over running topics. |
| 2 | NEA:  Part 2: Designing a prototype   * Presenting final ideas * Working drawings * Planning for manufacture | | | NEA:  Part 3: Making a final prototype |
| 3 | NEA:  Part 2: Designing a prototype | | NEA:  Part 3: Making a final prototype | NEA:  Part 3: Making a final prototype |
| 4 | NEA:  Part 2: Designing a prototype | NEA:  Part 3: Making a final prototype | | NEA:  Part 3: Making a final prototype |

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| **Lesson** | **Summer 1st half** | | **Summer 2nd half** |
| 1 | Revision | Exams |  |
| 2 | NEA:  Part 4: Evaluating own design and prototype | Exams |  |
| 3 | Prepare for assessment of NEA | Exams |  |
| 4 | Prepare for assessment of NEA | Exams |  |

## Delivery Option 2

### A level co-teachable with AS standalone qualification

This sets out a two year programme illustrating how to deliver the course with an AS cohort. For the purposes of this course planner, it has been assumed that the centre is delivering 36 teaching weeks in year one including part of the summer term after mock examinations, and 30 teaching weeks in year two. The delivery of the course allows AS examinable work to be completed in preparation for examinations, followed by the start of A Level work following the examination period.

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| **Year 1** | | | | |
| **Lesson** | **Autumn 1st half** | | **Autumn 2nd half** | |
| 1 | Topic 1: Materials and Topic 2: Performance Characteristics of Materials   * 1 lesson/ material type * Taught in conjunction with 3.1 Processes and Techniques in Lesson 2. * Smart materials (1.7) taught here or could be a standalone session later. | | 3.4 Joining techniques  3.5 Finishing techniques  5.1 User-centred design  5.2 Ergonomics and Anthropometrics  5.3 Form over Function  Topic 7: Potential hazards and risk assessment  Mock examinations preparation | |
| 2 | 3.1 Processes & Techniques (in conjunction with Lesson 1 Topics 1 and 2). Divided into;   * Metals (a), (b) and (d) * Machining (e) various materials * Wood (g) and (h). * Polymers (f) * Printing (c) * Marking out (i) various materials | | 5.4 History of Design Theory   * One week allocated to each movement (a) – (g) | |
| 3 | Controlled selection of products made available for students to prepare presentations on their chosen products.  Products to be analysed and justification for their materials/manufacture choice and overall design decisions, using the theory knowledge taught in lessons 1 and 2.  Presentation could take place after the start of the new term. | | NEA: Design and develop a product from a provided list of suggested starting points. Range of products reflecting the interest of the students.  Part 1: Identifying opportunities for design   * Research techniques * Specification * Design methodology * Developing designs | |
| 4 | 3.2 Specialist measuring tools and equipment  3.3 Drawing techniques  4.1 Digital technologies (a) Use of CAD | Focused Practical task – suggest choice, one to be a concept model outcome and one to be architecturally focused.  Manufactured from drawings – with minimal design input. | | NEA:  Part 2: Designing a prototype  Part 3: Making a final prototype |

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| **Year 1** | | | | |
| **Lesson** | **Spring 1st half** | | | **Spring 2nd half** |
| 1 | 4.1 Digital Technologies (b) CAM & rapid prototyping  6.1 Effects of Technological developments  (a) Mass production  (b) Industrial age  (c) Global marketplace | | | Revision time or catch up for over running topics. |
| 2 | NEA:  Part 2: Designing a prototype   * Presenting final ideas * Working drawings * Planning for manufacture | | | NEA:  Part 3: Making a final prototype |
| 3 | NEA:  Part 2: Designing a prototype | | NEA:  Part 3: Making a final prototype | NEA:  Part 3: Making a final prototype |
| 4 | NEA:  Part 2: Designing a prototype | NEA:  Part 3: Making a final prototype | | NEA:  Part 3: Making a final prototype  Part 4: Evaluating own design and prototype |

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| **Year 1** | | | |
| **Lesson** | **Summer 1st half - AS level** | | **Summer 2nd half – A level** |
| 1 | Revision | Exams | Techniques to support Year 2 NEA:   * Advanced CAD use * Working drawings * Application of CAD modelling to a client |
| 2 | NEA:  Part 4: Evaluating own design and prototype | Exams | 11.1 Information Handling, modelling and forward planning  (a) Marketing  (b) Innovation management  (c) Feasibility studies |
| 3 | Prepare for assessment of NEA | Exams | NEA:  Part 1: Identifying and outlining possibilities for design   * Establishing a problem * Problem negotiation/justification |
| 4 | Prepare for assessment of NEA | Exams | NEA:  Part 1: Identifying and outlining possibilities for design   * Problem investigation * Research |

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| **Year 2** | | |
| **Lesson** | **Autumn 1st half** | **Autumn 2nd half** |
| 1 | 8.1 Characteristics and stages of methods of production when applied to products and materials  8.2 Characteristics, application, advantages and disadvantages of quality monitoring systems  8.3 Characteristics, processes, application, advantages and disadvantages of modern manufacturing methods and systems  (a) Production scheduling and logistics  (b) Robotics in production  (c) Materials handling systems  11.4 Implications of standards | 8.3 Characteristics, processes, application, advantages and disadvantages of modern manufacturing methods and systems  (d) FMS and modular/cell production systems  (e) Lean manufacturing (JIT)  (f) Standardised parts and bought-in components  (g) QRM  (h) PDM/ERP  (i) Concurrent manufacturing |
| 2 | 11.2 Modelling the costing of projects  12.1 Strategies, techniques and approaches to explore, create and evaluate design ideas | Topic 10 Current Legislation  11.3 Intellectual property rights  12.2 Project management |
| 3 | NEA:  Part 1: Identifying and outlining possibilities for design   * Specification   Part 2: Designing a prototype | NEA:  Part 2: Designing a prototype  Part 3: Making a final prototype |
| 4 | NEA:  Part 2: Designing a prototype | NEA:  Part 2: Designing a prototype  Part 3: Making a final prototype   * Modelling |

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| **Year 2** | | |
| **Lesson** | **Spring 1st half** | **Spring 2nd half** |
| 1 | Topic 9 Designing for maintenance and the cleaner environment  12.3 Product life cycle | NEA:  Part 3: Making a final prototype  Part 4: Evaluating own design and prototype |
| 2 | NEA:  Part 3: Making a final prototype   * Planning and making | NEA:  Part 3: Making a final prototype  Part 4: Evaluating own design and prototype |
| 3 | NEA:  Part 3: Making a final prototype   * Planning and making | NEA:  Part 3: Making a final prototype  Part 4: Evaluating own design and prototype |
| 4 | NEA:  Part 3: Making a final prototype   * Planning and making | NEA:  Part 3: Making a final prototype  Part 4: Evaluating own design and prototype |

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| **Year 2** | | | |
| **Lesson** | **Summer 1st half** | | **Summer 2nd half** |
| 1 | Revision | | Exams |
| 2 | Revision | | Exams |
| 3 | Prepare for assessment of NEA | Revision | Exams |
| 4 | Prepare for assessment of NEA | Revision | Exams |

## Delivery Option 3

### A level standalone qualification

This sets out a two year programme illustrating how to deliver the course without an AS cohort. For the purposes of this scheme of work, it has been assumed that the centre is delivering to 36 teaching weeks in each year one including part of the summer term after mock examinations, and 30 teaching weeks in year two.

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| **Year 1** | | | | | |
| **Lesson** | **Autumn 1st half** | | **Autumn 2nd half** | | |
| 1 | Topic 1: Materials and Topic 2: Performance Characteristics of Materials   * 1 lesson/ material type * Taught in conjunction with 3.1 Processes and Techniques in Lesson 2. * Smart materials (1.7) taught here or could be a standalone session later. | | 3.4 Joining techniques  3.5 Finishing techniques  5.1 User-centred design  5.2 Ergonomics and Anthropometrics  5.3 Form over Function  Topic 7: Potential hazards and risk assessment  Mock examinations preparation | | |
| 2 | 3.1 Processes & Techniques (in conjunction with Lesson 1 Topics 1 and 2). Divided into;   * Metals (a), (b) and (d) * Machining (e) various materials * Wood (g) and (h). * Polymers (f) * Printing (c) * Marking out (i) various materials | | 5.4 History of Design Theory   * One week allocated to each movement (a) – (g) | | |
| 3 | Controlled selection of products made available for students to prepare presentations on their chosen products.  Products to be analysed and justification for their materials/manufacture choice and overall design decisions, using the theory knowledge taught in lessons 1 and 2.  Presentation could take place after the start of the new term. | | | Design skills:   1. Approaches to designing 2. Modelling 3. presentation | Design and make assignment  This can be given or negotiated.  Short concise research/design and development |
| 4 | 3.2 Drawing techniques | Focused Practical task – manufacture a product choose one from;   1. concept model outcome such as iPod dock possibly with packaging (to be designed) and 2. One to be architecturally focused, perhaps a commercial building frontage with lit signage.   Manufactured from largely given drawings – with minimal design input. | | | NEA:  Part 2: Designing a prototype  Part 3: Making a final prototype |

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| **Year 1** | | |
| **Lesson** | **Spring 1st half** | **Spring 2nd half** |
| 1 | 4.1 Digital Technologies (b) CAM & rapid prototyping  6.1 Effects of Technological developments  (a) Mass production  (b) Industrial age  (c) Global marketplace | Revision time or catch up for over running topics. |
| 2 | Advanced CAD use (to support NEA).  Working drawings (to support NEA).  Application of CAD modelling to a client.  Use to enhance DMA | Design and make assignment |
| 3 | Design and make assignment | Design and make assignment |
| 4 | Design and make assignment | Design and make assignment |

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| **Year 1** | | |
| **Lesson** | **Summer 1st half - AS level** | **Summer 2nd half – A level** |
| 1 | Design and make assignment | 11.1 Information Handling, modelling and forward planning  (a) Marketing  (b) Innovation management  (c) Feasibility studies |
| 2 | Design and make assignment | NEA:  Part 1: Identifying and outlining possibilities for design   * Establishing a problem * Problem negotiation/justification * Research |
| 3 | Design and make assignment | NEA:  Part 1: Identifying and outlining possibilities for design   * Establishing a problem * Problem negotiation/justification * Research |
| 4 | Design and make assignment | NEA:   * Part 1: Identifying and outlining possibilities for design * Problem investigation * Research |

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| **Year 2** | | |
| **Lesson** | **Autumn 1st half** | **Autumn 2nd half** |
| 1 | 8.1 Characteristics and stages of methods of production when applied to products and materials  8.2 Characteristics, application, advantages and disadvantages of quality monitoring systems  8.3 Characteristics, processes, application, advantages and disadvantages of modern manufacturing methods and systems  (a) Production scheduling and logistics  (b) Robotics in production  (c) Materials handling systems  11.4 Implications of standards | 8.3 Characteristics, processes, application, advantages and disadvantages of modern manufacturing methods and systems  (d) FMS and modular/cell production systems  (e) Lean manufacturing (JIT)  (f) Standardised parts and bought-in components  (g) QRM  (h) PDM/ERP  (i) Concurrent manufacturing |
| 2 | 11.2 Modelling the costing of projects  12.1 Strategies, techniques and approaches to explore, create and evaluate design ideas | Topic 10 Current Legislation  11.3 Intellectual property rights  12.2 Project management |
| 3 | NEA:  Part 1: Identifying and outlining possibilities for design   * Specification   Part 2: Designing a Prototype | NEA:  Part 2: Designing a prototype  Part 3: Making a final prototype |
| 4 | NEA:  Part 2: Designing a prototype | NEA:  Part 2: Designing a prototype  Part 3: Making a final prototype   * Modelling |

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| **Year 2** | | |
| **Lesson** | **Spring 1st half** | **Spring 2nd half** |
| 1 | Topic 9 Designing for maintenance and the cleaner environment  12.3 Product life cycle | NEA:  Part 3: Making a final prototype  Part 4: Evaluating own design and prototype |
| 2 | NEA:  Part 3: Making a Final Prototype   * Planning and making | NEA:  Part 3: Making a Final Prototype  Part 4: Evaluating own design and prototype |
| 3 | NEA:  Part 3: Making a final prototype   * Planning and making | NEA:  Part 3: Making a final prototype  Part 4: Evaluating own design and prototype |
| 4 | NEA:  Part 3: Making a final prototype   * Planning and making | NEA:  Part 3: Making a final prototype  Part 4: Evaluating own design and prototype |

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| **Year 2** | | | |
| **Lesson** | **Summer 1st half** | | **Summer 2nd half** |
| 1 | Revision | | Exams |
| 2 | Revision | | Exams |
| 3 | Prepare for assessment of NEA | Revision | Exams |
| 4 | Prepare for assessment of NEA | Revision | Exams |