

Chapelton Academy Y12 Curriculum Intent Plan
Subject: BTEC LEVEL 3 Engineering – MHA

Procedural knowledge (exam technique, skills etc):

- a. Written communication and presentation skills
- b. Design communication and presentation skills
- c. Practical skills
- d. Research and referencing skills
- e. Understanding the key command words
- f. Report writing
- g. Summary note-taking skills
- h. Organisation and time-management
- i. Self-evaluation skills
- j. Revision techniques
- k. Literacy, numeracy & IT skills

Learn fundamentals of BS8888 in respect of layout and basic drawing requirements (from Unit 2 Learning Aim B)

(12 lessons approx. 11 hours)

Unit 10 Computer Aided Design in Engineering 60 GLH

(68 lessons approx. 62 hours)

B Develop two-dimensional detailed computer-aided drawings of an engineered product that can be used as part of other engineering processes

Use AutoCAD to create 2D drawings

B1: 2D drawing commands

B2: Development of 2D engineering drawings

B3: Output of 2D drawings

A Develop a three-dimensional computer-aided model of an engineered product that can be used as part of other engineering processes

C Develop a three-dimensional computer-aided model for a thin walled product and a fabricated product that can be used as part of other engineering processes.

Use Autodesk Inventor to create 3D drawings

A1 and C1: 3D parametric modelling

A2 and C2: Develop 3D components

A3 and C3: Develop a 3D model

A4 and C4: Output of drawings from a model

Unit 6 Microcontroller Systems for Engineers 120GLH – (Introductory lesson + 10 Arduino lessons)

(22 lessons approx. 20 hours)

Unit 45 Additive Manufacturing Processes 60 GLH (24 lessons approx. 22 hours)

A Examine the technology and characteristics of additive manufacturing processes as used in industry

A1 AM processes

A2 Safe working practices for AM processes

B Investigate component design considerations and finishing processes required to effectively use additive manufacturing processes

B1 Design considerations for AM processes

B2 Component finishing processes post-additive manufacturing

C Develop a component using additive manufacturing processes safely.

C1 Component design for additive manufacture

C2 Manufacture of a component using an AM process

Week & Date	No of lessons	Disciplinary Knowledge sequence	Activities	Disciplinary knowledge, that this interleaves with	Procedural knowledge progression	RS revision knowledge topic	HW focus and actions	Assessment (topic and skills assessed)
1 4 th September 2023 4 th Sept Staff Inset 5 th Sept Y12 Start 6 th Sept Y13 Start	4 7/9/2023	Discuss drawing boards, drawing equipment, orthographic drawings, layout of 3rd angle views, linetypes, hidden lines. Coordinates: absolute, relative and polar	Intro to Units. Using Teams. Link to electronic copy of BTEC National Book. Setting up folders in OneDrive, Sharing folders with other people Start Unit 10 LA-B BS8888 and international standards. 01 Scale exercise, 02 Find the Orthographic view exercise A-M, 03 Find the Dimension exercise, 04 Orthographic drawing exercises	Associated parts of Unit 2 LA-B, Unit 3, Unit 5	b, g, k		Read chapter 10 pp359-361 of BTEC National book	
2 11 th September 2023	4 14/9/2023	Use AutoCAD to create 2D drawings: Create layers	Watch SourceCAD video 1/3. Watch SourceCAD video 2/3	Associated parts of Unit 2 LA-B, Unit 3, Unit 5	b, g, k	Layout of Orthographic drawings,	Read chapter 2 pp89-96 of BTEC National book. Revise for online test for next lesson 21/9/2023.	

		Create linetypes, colours, line thicknesses. Drawing lines, using keyboard shortcuts Printing to PDF	Drawing SourceCAD example drawing Watch SourceCAD video 3/3 Adding dims to drawing, layers, blocks, printing to PDF. Setting up AutoCAD. Sign up for AutoDesk account to download software at home.				B1 Principles of Engineering Drawing B2 Two-dimensional (2D) computer-aided drawing.	
3 18 th September 2023	4 21/9/2023	Layout of 3 rd angle orthographic drawings	Draw third angle orthographic symbol. Do online test to recap chapter 2 of BTEC book. Fun exercise – Mickey Mouse.	Associated parts of Unit 2 LA-B, Unit 3, Unit 5	b, k	Linetypes, line thicknesses	Watch videos: Level 1, 2 (excluding 2-1 and 2-3)and 4: https://www.mycadsite.com/tutorials.html	<i>Online test - B1 and B2 of Unit 2</i> <i>DATA – 22nd September</i>
4 25 th September 2023 27 th Sept Y12 Awards	4 28/9/2023	BS8888 Title block and border for all drawings	Create drawing template for drawings – border, title block sizes. Information. Attributes. Creating blocks and wblocks. Saving drawings as A3 pdfs.	Associated parts of Unit 2 LA-B, Unit 3, Unit 5	b, g, k	BS8888 border sizes	Read Unit 10 pp360-361 Learning Aim B Section B pp374-377 of BTEC National Book	
5	4 5/10/2023	Use functions and keyboard shortcuts of AutoCAD to produce 2D drawings.	Basic 2D drawing exercises x 7	Associated parts of Unit	b, g, k	Dimensioning	Read Unit 10 Section B pp374-377 of BTEC National Book	

2 nd October 2023		BS8888 Dimensioning rules.	Add dimensions to drawings.	2 LA-B, Unit 3, Unit 5				
6 9 th October 2023 10 th Oct Staff Inset 12 th Oct Progress Day 31 st Oct Y12 Parents Eve (tutor)	12/10/2023	PROGRESS DAY						
7 16 th October 2023 17 th Oct Twilight CPD	4 19/10/2023	Sectioning/hatching. Viewports, scales of viewports.	Intermediate drawing exercises, 40, 49 Advanced drawing exercises: 76,98, 100.	Associated parts of Unit 2 LA-B, Unit 3, Unit 5	b, g, k	Viewports	Read Unit 10 Section B pp382 of BTEC National Book	
23 rd October 2023		Holiday						
9 30 th October 2023	4 2/11/2023	Unit 10 Computer Aided Design in Engineering UNIT 10 ASSESSMENT LA-B	ASSESSMENT LA-B: Start drawing machine vice drawings using AutoCAD	Associated parts of Unit 2 LA-B, Unit 3, Unit 5	a, b, e, h, k		Continue with machine vice assessment drawings.	Unit 10 LA-B
10	4 9/11/2023	UNIT 10 ASSESSMENT LA-B	ASSESSMENT LA-B: Drawing machine vice drawings using AutoCAD	Associated parts of Unit 2 LA-B, Unit 3, Unit 5	a, b, e, h, k		Continue with machine vice assessment drawings.	Unit 10 LA-B

6 th November 2023 8 th Nov Open Evening								
11 13 th November 2023	4 16/11/2023	UNIT 10 ASSESSMENT LA-B	ASSESSMENT LA-B: Drawing machine vice drawings using AutoCAD	Associated parts of Unit 2 LA-B, Unit 3, Unit 5	a, b, e, h, k		Continue with machine vice assessment drawings.	Unit 10 LA-B
12 20 th November 2023 24 th Nov Staff Inset	4 23/11/2023	Use Autodesk Inventor to create 3D drawings	Start Inventor - creating project folders. Using planes for 2D sketches, extruding. Create key fob shapes. 3D print.	Associated parts of Unit 2 LA-B, Unit 3, Unit 5, Unit 45	b, g, k	Extruding 2D shapes	Read Unit 10 Section A, A1 pp362-367 of BTEC National Book	
13 27 th November 2023	4 30/11/2023	Converting 3D drawings to 2D orthographic drawings.	Draw at least 2 blocks from exercise sheet - convert to 3rd angle orthographic views plus isometric view with dimensions and titles. Finish 3D printing keyfobs for Christmas.	Associated parts of Unit 2 LA-B, Unit 3, Unit 5, Unit 45	b, g, k	Converting to orthographic drawings	Read Unit 10 Section A2 and A3 pp367- 369 of BTEC National Book	
14 4 th December 2023	4 7/12/2023	Assembling 3D parts. Finite Element Analysis.	G-Cramp exercise – draw main body, spindle, spindle cap and handle. Assemble.	Associated parts of Unit 2 LA-B, Unit 3, Unit 5, Unit 45	b, g, k	Assembling parts	Read Unit 10 Section A4 pp370-373 of BTEC National Book	Marks for Unit 10 LA-B

7 th Dec Twilight CPD			Stress Analysis - setting up with fixed point and force. Finish 3D printing keyfobs for Christmas					
15 11 th December 2023	4 14/12/2023	Altering title block to BS8888. Dimensioning to BS8888.	Convert assembly drawing to 3rd angle orthographic dwg. Add dims, titles, complete title block. Finish 3D printing keyfobs for Christmas.	Associated parts of Unit 2 LA-B, Unit 3, Unit 5, Unit 45	b, g, k	Title block	Read Unit 10 Section B pp374-377 of BTEC National Book	
16 18 th December 2023	4 21/12/2023	Storyboarding Creating a BOM (bill of materials)	Storyboard - exploded view, save as a video file. Exploded view from presentation file, snapshot, BOM (parts list), label items. Change title properties using Field Text. Finish 3D printing keyfobs for Christmas.	Associated parts of Unit 2 LA-B, Unit 3, Unit 5, Unit 45	b, g, k	Animation. Materials list.	Read Unit 10 Section B pp382 of BTEC National Book	
25 th December 2023		Holiday						
1 st January 2024		Holiday						

19 8 th January 2024 11 th Jan Alumni Awards Evening	4 11/1/2024 Unit 3 – 8hrs between 8/1/24 – 19/1/24 (this would be for all Y12's on the triple and any Y13's that need to resit)	Creating 3D shaded images	Create an assembly with 3 different objects with the XY, XZ, YZ planes etched into them. Finish off G-cramp drawing to show a general arrangement of assembled product, 3D shaded assembled image, 3rd angle orthographic drawings of each part complete with dims and titles plus title block with 3rd angle ortho symbol.	Associated parts of Unit 2 LA-B, Unit 3, Unit 5, Unit 45	b, k	Presentation		
20 15 th January 2024 16 th Jan Progress Day	4 18/1/2024 Unit 3 – 8hrs between 8/1/24 – 19/1/24 (this would be for all Y12's on the triple and any Y13's that need to resit)	UNIT 10 ASSESSMENT LA-A	Start drawing Machine vice parts using AutoDesk Inventor	Associated parts of Unit 2 LA-B, Unit 3, Unit 5, Unit 45	a, b, e, h, k			<i>DATA – 11th January</i> Unit 10 LA-A
21 22 nd January 2024 22 nd Jan Twilight CPD	4 25/1/2024	UNIT 10 ASSESSMENT LA-A	Continue drawing Machine vice parts using AutoDesk Inventor	Associated parts of Unit 2 LA-B, Unit 3, Unit 5, Unit 45	a, b, e, h, k			Unit 10 LA-A

22 29 th January 2024	4 1/2/2024	UNIT 10 ASSESSMENT LA-A	Continue drawing Machine vice parts using AutoDesk Inventor	Associated parts of Unit 2 LA-B, Unit 3, Unit 5, Unit 45	a, b, e, h, k			Unit 10 LA-A
23 5 th February 2024 6 th Feb Open Evening 8 th Feb Staff Inset	4 8/2/2024	Using Inventor to create a thin-walled product and a fabricated product	Creating 2D sheet metal objects using Inventor – and converting into 3D components. Rendering.	Associated parts of Unit 2 LA-B, Unit 3, Unit 5, Unit 45	b, g, k		Read Unit 10 Section C pp378-382 of BTEC National Book	
12 th February 2024		Holiday						
25 19 th February 2024	4 22/2/2024	Using Inventor to create a thin-walled product and a fabricated product	Creating 2D sheet metal objects using Inventor – and converting into 3D components. Rendering.	Associated parts of Unit 2 LA-B, Unit 3, Unit 5, Unit 45	b, k			Marks for Unit 10 LA-A
26 26 th February 2024 28 th Feb Twilight CPD	4 29/2/2024	Unit 10 ASSESSMENT LA-C	Measure parts of Helmer drawer unit. Drawing parts in Inventor	Associated parts of Unit 2 LA-B, Unit 3, Unit 5, Unit 45	a, b, e, h, k			Unit 10 LA-C
27	4 7/3/2024	Unit 10 ASSESSMENT LA-C	Measure parts of Helmer drawer unit.	Associated parts of Unit 2 LA-B, Unit	a, b, e, h, k			Unit 10 LA-C

4 th March 2024			Drawing parts in Inventor	3, Unit 5, Unit 45				
28 11 th March 2024	4 14/3/2024	Unit 10 ASSESSMENT LA-C	Measure parts of Helmer drawer unit. Drawing parts in Inventor	Associated parts of Unit 2 LA-B, Unit 3, Unit 5, Unit 45	a, b, e, h, k			Unit 10 LA-C
29 18 th March 2024	4 21/3/2024	Unit 45 Additive Manufacturing Processes	Introduction to unit 45.	Associated parts of Unit 2 LA-B, Unit 3, Unit 5, Unit 10	a, b, c, d, e, f, g, h, i, k		Research	
30 25 th March 2024 Fri 29 th March Bank Holiday	2 28/3/2024 2	Unit 6 microcontroller unit Unit 45 LA-C	Arduino Lesson 00 – GETTING STARTED C1 Component design for additive manufacture Using Inventor to design and draw 3D objects for Unit 45 LA-C assignment	Unit 1 Units 2, 10, 39, 41	c, d, j, h a, b, c, e, f, h, i, k		Research – reading Arduino books Watching Paul McWhorter videos.	DATA – 28th March Marks for Unit 10 LA-C Unit 45 LA-C
1 st April 2024		Holiday						
8 th April 2024		Holiday						
33	2 18/4/2024	Unit 6 microcontrollers	Arduino Lesson 01 – ELECTRICITY BASICS	Unit 1	c, d, j, h		Research – reading Arduino books Watching Paul McWhorter videos.	

15 th April 2024 18 th Apr Progress Day 18 th April Y12 Parents Eve	2	Unit 45 LA-C	Using Inventor to design and draw 3D objects for Unit 45 LA-C assignment	Units 2, 10, 39, 41	a, b, c, e, f, h, i, k		Unit 45 LA-C
34 22 nd April 2024	2 25/4/2024	Unit 6 microcontrollers	Arduino Lesson 02- OHMS LAW	Unit 1	c, d, j, h	Research – reading Arduino books Watching Paul McWhorter videos.	
	2	Unit 45 LA-C	Using Inventor to design and draw 3D objects then 3D print for Unit 45 LA-C assignment. C2 Manufacture of a component using an AM process	Units 2, 10, 39, 41	a, b, c, e, f, h, i, k		Unit 45 LA-C
35 29 th April 2024 30 th Apr Summer Exams Start 2 nd May Twilight CPD	2 2/5/2024	Unit 6 microcontrollers	Arduino Lesson 03 – TRAFFIC LIGHTS	Unit 1	c, d, j, h	Research – reading Arduino books Watching Paul McWhorter videos.	
	2	Unit 45 LA-C	3D print 3D objects for Unit 45 LA-C assignment	Units 2, 10, 39, 41	a, b, c, e, f, h, i, k		Unit 45 LA-C

36 6 th May 2024 6th May Bank Holiday	2 9/5/2024	Unit 6 microcontrollers	Arduino Lesson 04 – DIMMER SWITCH	Unit 1	c, d, j, h		Research – reading Arduino books Watching Paul McWhorter videos.	
	2	Unit 45 LA-C	3D print 3D objects for Unit 45 LA-C assignment	Units 2, 10, 39, 41	a, b, c, e, f, h, i, k			Unit 45 LA-C
37 13 th May 2024	2 16/5/2024	Unit 6 microcontrollers	Arduino Lesson 05 - HOLIDAY LIGHTS	Unit 1	c, d, j, h		Research – reading Arduino books Watching Paul McWhorter videos.	
	2	Unit 45 LA-A	A Examine the technology and characteristics of additive manufacturing processes as used in industry	Units 2, 10, 39, 41	a, d, e, f, g, h, k		Research additive manufacturing processes	Unit 45 LA-A
38 20 th May 2024	4 23/5/2024 Unit 1 – 2hrs 23/5/24 (all Y12 triple and single students will sit this)	Unit 6 microcontrollers	Arduino Lesson 06 - SPORTS ROBOT	Unit 1	c, d, j, h		Research – reading Arduino books Watching Paul McWhorter videos.	Marks for Unit 45 LA-C
27 th May 2024		Holiday						
40 3 rd June 2024	2 6/6/2024	Unit 6 microcontrollers	Arduino Lesson 07 - WINDSHIELD WIPERS	Unit 1	c, d, j, h		Research – reading Arduino books Watching Paul McWhorter videos.	
							Research additive manufacturing processes	

	2	Unit 45 LA-A	Report examining the technology and characteristics of AM processes, including sustainability and safe working practices A1 AM processes	Units 2, 10, 39, 41	a, d, e, f, g, h, k			Unit 45 LA-A
41 10 th June 2024	2 13/6/2024	Unit 6 microcontrollers	Arduino Lesson 08 - MUSICAL KEYBOARD	Unit 1	c, d, j, h		Research – reading Arduino books Watching Paul McWhorter videos. Research additive manufacturing processes	
	2	Unit 45 LA-A	A1 AM processes	Units 2, 10, 39, 41	a, d, e, f, g, h, k			Unit 45 LA-A
42 17 th June 2024 21 st – 24 th June Y12 Study Leave 21 st June UCAS Convention	2 20/6/2024	Unit 6 microcontrollers	Arduino Lesson 09 - LIGHT WAVE RADAR	Unit 1	c, d, j, h		Research – reading Arduino books Watching Paul McWhorter videos. Research safe working practices for additive manufacturing processes	
	2	Unit 45 LA-A	A2 Safe working practices for AM processes	Units 2, 10, 39, 41	a, d, e, f, g, h, k			Unit 45 LA-A
43 24 th June 2024 21 st – 24 th June Y12 Study Leave	2 27/6/2024	Unit 6 microcontrollers Y12 Exam Leave Y12 Exams	Arduino Lesson 10 - SMART GREENHOUSE	Unit 1	c, d, j, h		Research – reading Arduino books Watching Paul McWhorter videos. Research safe working practices for additive manufacturing processes	
		Unit 45 LA-A		Units 2, 10, 39, 41	a, d, e, f, g, h, k			Unit 45 LA-A

24 th Jun Induction Day 25 th Jun – 2 nd July Y12 Mocks 2			A2 Safe working practices for AM processes					
44 1 st July 2024 25 th Jun – 2 nd July Y12 Mocks 2 2 nd July Twilight CPD 3 rd – 5 th July Post-18 Talks and Events 3 rd July Y12 Parents Eve (UCAS)	? 4/7/2024	Y12 Exams Post-18 Sessions						
45 8 th July 2024	4 11/7/2024	Mopping up of submissions						DATA – 12 th July Marks for Unit 45 LA-A
46 15 th July 2024	18/7/2024	Work Experience Week						