Engineering Timeline: Year 9 to 11

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year	Skills acquisition	Skills acquisition	Skills acquisition	Skills acquisition	Skills acquisition	Skills acquisition
9	G Clamp	G Clamp	Toolmakers Clamps	Toolmakers Clamps	Toolmakers Clamps	Junior Hacksaw
	Students further develop understanding of foundry work by using a split pattern to cast the g clamp frame casting. Students develop an understanding of complex work holding devices to machine the g clamp casting. Using a milling machine to profile flat surfaces Develop understanding of correct work holding in alignment to accurately drill and then tap the casting to accept the spindle Understand need of having the finished component clean prior to painting.	Develop an understanding of using a lathe to form the swivel foot of the g clamp by taper turning and specialised drilling Develop understanding of marking out and cutting a complex shape of the g clamp spindle wingnut Develop understanding of slotting the g clamp spindle in a milling machine Develop understanding of marking out for the g clamp handle wingnut shape Develop understanding of joining the spindle and wingnut by brazing Develop understanding of joining the swivel foot to the spindle by using a specialised clamping tool	Develop understanding of marking clamp bar stock lengths and cutting using a hacksaw Develop understanding of marking bar lengths, surface plate, scribing block, Centre punching and spring dividers. Develop understanding of clamping the halves ,drilling to depth settings, using specialised fixture bars Develop understanding of the correct use of taps to make a thread Drilling to make a thread clearance hole Understanding of clamping, then marking the halves as a pair to align using a single Allen screw .	Develop an understanding of using a milling machine and end mill to machine the clamp halves to length Develop understanding of marking the slope using surface plate , vernier gauge /steel rule/scribing block. Develop an understanding of using a milling machine ,end mill and setting plate to machine the slope Develop precision marking out for the clip Develop Precision drilling for the clip Develop understanding ,using a lathe to face ,centre drill and drill for the screw heads Develop understanding of the correct use of taps to make a thread in the bar	Develop understanding of cleanliness to undertake the Loctiting procedure for the studs to the hexagon head Develop understanding of marking the clip recess position in the screw head Develop understanding of using the grooving tool in the centre lathe to machine the clip groove Develop understanding of using a form tool in the centre lathe to dome the screw heads Develop understanding of fine drilling and tapping for elip plate in one clamp bar Develop understanding of cleaning bars to undertake Blueing process , using the gas torches and oil.	Students develop an understanding of the accuracy required in use of a jig to successfully, bend the steel rod to the correct shape. To use the jig to make the frame and check that it does conform to the required shape. To accurately mark the required position of the slots in the frame to take a junior hacksaw blade. Cutting the blade slots with a junior hacksaw To mark the position of the notches in the steel frame to accept the retaining pins of a junior hacksaw blade.
	End Point	End Point	End Point	End Point	End Point	End Point
	G-clamp casting complete.	G-clamp components assembled to completion	Clamp halves 80% machined	Clamp halves, screws, and clip 90% complete	Clamps 100% complete	
	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
	Qualitative verbal feedback and guidance given	Qualitative verbal feedback and guidance given	Qualitative verbal feedback and guidance given	Qualitative verbal feedback and guidance given	Qualitative verbal feedback and guidance given	Qualitative verbal feedback and guidance given

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Year 10	Quality of practical outcome Evaluation of independent progress. Self-assessment Peer assessment R015: Manufacturing a one- off product Students produce a Basic Production Plan for the products that they have already made in preparation for beginning Unit R115	Quality of practical outcome assessed Evaluation of independent progress Self-assessment. Peer assessment. R015: Manufacturing a one-off product ASSIGNMENT How to safely plan and produce a one-off product by using appropriate processes, tools and equipment	Quality of practical outcome Evaluation of independent progress Self-assessment. Peer assessment. R016: Manufacturing in quantity Use of CAD package. Students learn how to use Alpha Cam to produce drawing both as working drawings and for use on CNC machinery CNC- Students learn how to use set up use the CNC lathe and CNC milling machine to include worth and tool offsets	Quality of practical outcome Evaluation of independent progress Self-assessment Peer assessment R016: Manufacturing in quantity ASSIGNMENT How to manufacture using simple jigs and templates to support manufacturing in volume using Computer Aided Design (CAD) software and Computer Numerical Control (CNC) equipment. Topics include: Preparing for manufacture Preparing for manufacture Pevelop programmes to operate CNC equipment Safely use processes and equipment to make products in quantity Students complete the written elements of the Assignment	Quality of practical outcome Evaluation of independent progress Self-assessment Peer assessment Revision – R014: Principles of engineering Manufacture Manufacturing processes Engineering materials Manufacturing requirements Developments in engineering manufacture Students prepare and revise for PPEs using past papers and revision materials provided	Quality of practical outcome Evaluation of independent progress Self-assessment Peer assessment PPE Exam — R014: Engineering materials, processes, and production The results of the PPE are analysed and the answers to the questions worked through. Students to continue with making projects of their own choice
	End Point	End Point	End Point	End Point	End Point	End Point
	Students produce a number of production plans of suitable standard	Written aspect of assignment complete in all respects. product complete within tolerances	Students produce a number of CAD drawings of suitable standard	Written aspect of assignment complete in all respects. The product machined on CNC equipment completed within tolerances	PPE completed to required standard	Students to make progress with own projects

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Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
The production plans produced are assessed to ensure they are of the required standard	Unit R110 assessment sheets and witness statements completed for each students	The CAD drawings produced are assessed to ensure they are of the required standard	Unit R111 assessment sheets and witness statements completed for each students	PPE marked according to the mark scheme and the results fed back.	The papers are worked through to improve performance

Year 11	Revision – R014: Principles of engineering Manufacture Students prepare and revise for the public exam proper using past papers and revision materials provided SIT EXAM UNIT R014 –	All Units Prepare and revise for resit of unit R014 as necessary Review and improve units R015, R016	Prepare units R015, R016 for submission Email sample to the board for assessment		
	End Point	End Point	End Point		
	Students to sit the unit R014 exam	R015, R016 units ready for marking			
	Assessment	Assessment	Assessment		
	The results of the unit R014 exam marked by exam board.	R015, R016 Units all marked			