

## Curriculum Overview: ENGINEERING Y10

**Rationale:**

**(STUDENTS WILL BE FOLLOWING THIS PLAN OVER A 2 WEEK ROTATION AS STATED BELOW THE ROOMING WILL DETERMINE WHICH TYPE OF LESSON WILL BE TAKING PLACE AND AT WHAT TIME DURING EACH 2 WEEK ROTATION)**

Students will acquire an understanding of the properties and characteristics of a range of materials including Metals and Plastics, through the use of a range of Hand and Machine Based Manufacturing Processes and Techniques (e.g. Material Removal, Material Forming, Joining, Heat Treatment and Finishing). Further in depth knowledge of CAD software and Orthographic Drawing techniques.

Also a good theoretical knowledge of the principals of engineering from the specification R109, this will be assessed using the y9 PPE and a later in class examination using past papers. Students to mark this work as a discussion exercise to ensure that the written technique is being employed and confidence in further exams will improve ready for the end of the year's exam.

Students following the Cambridge National Qualification are required to complete 4 units, R109 – external exam, R110, R111 and R112.

Term / Length of Unit	Outline	Assessment	Home Learning	Resources	Reading	Knowledge/Skills End Points
<b>Term 1</b> <b>7 weeks</b>	<p><b>R110 CONTINUATION</b></p> <p><b>R110</b> Students explore the process of manufacturing the embossing tool, and record and identify the stages of production. Consider the H&amp;S implications at each stage and where essential quality control checks should be carried out.</p>	Feedback on the understanding of manufacturing process.	Research into One-off, batch and mass production and the implications of each.	Worksheets Theory book Knowledge Organiser ICT Facilities Support Guide	<p>Knowledge Organiser Revision booklet Sequence of practical tasks Research and write tasks. Support Guide</p> <p>Power point information Key words</p>	<p><b>Theory;</b></p> <ul style="list-style-type: none"> <li>Understanding Quality Control</li> <li>Understanding the implications of H&amp;S for the employer and employee</li> <li>PPE and safety precautions including COSHH</li> </ul> <p><b>Practical – On rotation due to only having 2 lathes, students complete the manufacture of their embossing tool.</b></p> <p><b>In addition students carry out a selection of multi tasks making mini products.</b></p>
<b>Term 2</b> <b>8 weeks</b>	<p>R110 Hand embossing tool plus folder</p> <p>Theory along-side it (R109)</p> <p>1-2 theory lesson (R109) 2 ICT lessons (power point) 1-2 practical lessons (hand embossing tool) depending on machines.</p>	FEEDBACK BASED ON SPECIFICATION CRITERIA	<p>21) Moulding 22) safe use of tools and equipment (Lathe) 23) safe use of tools and equipment (Milling Machine)</p>	<p>Computer suits to research and develop their understanding of drawings and standards.</p> <p>Lathes, Milling machines, hand tools. And making of the embossing tool</p>		Lathes, Milling machines, hand tools. And making of the embossing tool
<b>Deadline for R110</b>						
<b>Term 3</b> <b>6 weeks</b>	<p><b>R111 INTRODUCTION</b></p> <p><b>R111</b> Introduction to advantages and disadvantages of CNC. Identification of different CNC processes. Clear statement of the intent of the R111, how students will progress through the process in school.</p>	Feedback on the understanding of CNC Processes.	<p>CNC Exam style question 1</p> <p>CNC Exam style question 2</p>	Worksheets Theory book Knowledge Organiser ICT Facilities Support Guide	<p>Knowledge Organiser Revision booklet Sequence of practical tasks Research and write tasks. Support Guide</p> <p>Power point information Key words</p>	<p><b>Theory;</b></p> <ul style="list-style-type: none"> <li>What is CNC and how it benefits the manufacturing process</li> <li>Different types of CNC</li> <li>Strategy for using CNC in school – which devices and why?</li> <li>Introduction to CNC control</li> </ul> <p><b>R111 - Students commence with the development of their R111 completing;</b></p> <ul style="list-style-type: none"> <li>Introduction to CAD – 2D and 3D advantages and disadvantages</li> <li>Interpretation of Orthographic Drawing</li> <li>Production planning for the manufacture of the embossing tool.</li> <li>Comparison of CNC vs Manual production.</li> <li>Identification and description of use of tools and equipment.</li> </ul>

<b>Term 4</b> <b>5</b> <b>weeks</b>	<b>R111 CONTINUATION</b>  <b>R111</b> Students continue to work through the R111, completing the section.	Feedback on the understanding of CNC Processes.	CNC Exam style question 1  CNC Exam style question 2	Worksheets Theory book Knowledge Organiser ICT Facilities Support Guide	Knowledge Organiser Revision booklet Sequence of practical tasks Research and write tasks. Support Guide  Power point information Key words	<b>Theory;</b> <ul style="list-style-type: none"> <li>• What is CNC and how it benefits the manufacturing process</li> <li>• Different types of CNC</li> <li>• Strategy for using CNC in school – which devices and why?</li> <li>• Introduction to CNC control</li> </ul> <b>R111 - Students commence with the development of their R111 completing;</b> <ul style="list-style-type: none"> <li>• Setting up the CNC machines – photographic evidence and explanations.</li> <li>• Inclusion of CAD drawings showing the stages of generation of the part drawing.</li> <li>• Screenshot presentations and explanations of each stage.</li> <li>• Identification and samples of G and M codes.</li> </ul>
<b>Term 5</b> <b>6</b> <b>weeks</b>	R109 REVISION AND PAST PAPER PROVISION	<b>INTERNAL EXAMS</b>		Computer access to develop understanding of topics along with exams		Further understanding of R109 and the specification as each student marks and embeds their knowledge.
<b>External Exam 1</b>						
<b>Term 6</b> <b>7</b> <b>weeks</b>	<b>R111 CONTINUATION</b>  R109 REVISION AND PAST PAPER PROVISION	<b>INTERNAL EXAMS</b>	<b>Revision</b>	Computer access to develop understanding of topics along with exams	Knowledge Organiser Revision booklet Sequence of practical tasks Research and write tasks. Support Guide  Power point information Key words	Where appropriate students will continue to complete elements of the R111, but the main focus will be to focus on revision and preparation for the external exam. This will be supported by a revision program, support guide, past questions and papers along with dedicated revision power points and lessons.  Further understanding of R109 and the specification as each student marks and embeds their knowledge.