



### **Intent for the Year 10 Engineering Studies Curriculum 2021-2022**

'All children will experience a well-balanced and comprehensive curriculum that enhances informed, intellectual, developmental and moral character. As a result, this will improve life chances, inter-personal relationships, social mobility and preparedness for employment. Our curriculum will encourage everyone to have a positive impact on society.'

*We feel that the WJEC Level 1/2 Awards in Engineering offers a learning experience that focuses learning for 14-16 year olds through applied learning, i.e. acquiring and applying knowledge, skills and understanding through purposeful tasks set in sector or subject contexts that have many of the characteristics of real work that the GCSE version lacks for our students. The applied purpose is the vehicle through which the learning contained in the unit is made relevant and purposeful. It is also the means by which learners are enthused, engaged and motivated to study engineering. The applied purpose provides the opportunity for authentic work related learning, but more than this, it will require learners to consider how the use and application of their learning impacts on individuals, employers, society and the environment. The applied purpose will also enable learners to learn in such a way that they develop:*

*The qualifications have been devised around the concept of a 'plan, do, review' approach to learning where learners are introduced to a context for learning, review previous learning to plan activities, carry out activities and review outcomes and learning. This approach mirrors engineering production and design processes and also provides for learning in a range of contexts thus enabling learners to apply and extend their learning.*

*The qualification provides learners with a broad appreciation of work in engineering related industries and wider opportunities for progression into further education, employment or training. The qualification has been designed to build on the skills, knowledge and understanding acquired at Key Stage 3, particularly skills related to literacy, numeracy, use of technology and design. These are just some of the reasons why I believe that this course is best suited to our students.*

### **Implementation:**

*Students are covering the WJEC Vocational Engineering Studies course Level 1 & 2 Students receive 3 one hours lessons over a week. Time is split between workshop, ICT suite and classroom.*

### **Curriculum adaptations as a result of the pandemic:**



*The result of the pandemic will result in this year 10 having to cover extra practical time to make up for the lack of workshop time that they missed in year 8 and year 9 - specific projects have been addressed to deal with the skills shortage in preparation for the next steps. The current year 10 will not benefit from the redesigned ks3 curriculum which has a greater focus on engineering, however all learning taking place will be recorded and students will be supported in a variety of ways to bridge this gap in knowledge. This subject has not been covered in detail at KS3 so students studying Engineering will be learning new material and therefore require a range of formative assessment and summative assessment more often to check progress is improving.*

Term	Enquiry/Topic/Unit: <i>What is going to be taught?</i>	Key Outcomes: <i>What will students have achieved by completing this scheme of learning?</i>	Character Education: <i>How does this topic link to a sense of Self, Others and the World, in terms of Character Education?</i>	Assessment: <i>Will there be formative and/or summative testing? What role will interleaving play? How will this be marked?</i>	Vocabulary: <i>What are the key words for this topic/unit that students must know?</i>	Home-Learning: <i>What homework will be set and why (e.g. consolidate/extend)? How will this be marked?</i>
1a	<p><b><u>Introduction to course and expectations</u></b></p> <p><b><u>Students must be able to communicate design solutions</u></b></p> <p><i>· Draw engineering design solutions</i></p> <p><i>Convert between isometric sketches and 3rd angle orthographic projections</i></p> <p><i>Communicate design ideas</i></p> <p><b><u>Students must be able to use engineering processes &amp; forming processes</u></b></p>	<p>Students will be able to clearly demonstrate presentation techniques using traditional methods and modern CAD techniques using a variety of CAD software.</p>	<p>Enquiry based learning provides a vehicle to developing a sense of the world and their responsibility within it.</p> <p>6 of the character traits can be extracted through the work in year 10</p> <p>At the end of each term students sit an Assessment- The feedback policy is designed to develop a sense of reflection.</p> <p>Students are given the opportunity to be responsible for their written work and health and</p>	<p>Formative assessment is integral to everyday teaching - within each student' Tool box' is a tool to build confidence, and reduce anxiety and it is embedded into teaching activities within each lesson. Via the use of formative assessment approaches, low stake testing and retrieval practice techniques , our aim is to be the best prepared to help our</p>	<p>Draw (using British Standards)</p> <ul style="list-style-type: none"> <li>• 3rd angle orthographic projection</li> <li>• Isometric</li> <li>• Dimensions and associated symbols</li> <li>• Diameter, circumference, radius, height, depth, width</li> <li>• Conventions</li> <li>• Title block</li> <li>• Dimension lines</li> <li>• Extension lines</li> <li>• Centre lines</li> <li>• Metric units of measurement</li> </ul>	<p><b>A range of Drawing activities converting from one style to another</b></p> <p><b>Knowledge of tool and equipment quizzes</b></p> <p><b>Write up their own product disassembly using acronyms</b></p>



	<p><i>Use engineering processes in production of engineered products:</i></p> <p><b><u>Student must be able to use engineering equipment</u></b></p> <ul style="list-style-type: none"> <li>· <i>Use tools in production of engineering products</i></li> <li>· <i>Use equipment in production of engineering products</i></li> </ul>	<p>Students will build upon knowledge transferred across from KS3 and develop and integrate new techniques to increase their skill sets</p>	<p>Safety within the work shop.</p> <p>Students do need resilience to allow mistakes to happen but to have enough grit not to deter them but to enhance their learning and drive them to make another attempt until the learning has taken place. – this builds confidence when they are able to complete the tasks.</p> <p>At the end as mentioned above there are reflective and act upon feedback to improve areas of weakness.</p>	<p>students embed and use knowledge fluently to improve long term knowledge retention.</p>	<ul style="list-style-type: none"> <li>• Hidden Detail</li> <li>• Scale</li> </ul>	<p><b>Revision for the mock exam</b></p> <p><b>Revision guide given</b></p> <p><b>Different areas assessed</b></p>
<p><b>1b</b></p>	<p>Students must know how engineered products meet requirements</p> <ul style="list-style-type: none"> <li>• Identify features that contribute to the primary function of engineered products</li> <li>• Identify features of engineered products that meet requirements of a brief:</li> </ul>	<p>Here students tackle many disassembly projects and learn first-hand how products are made, being able to identify many component parts and fixings which allows the products to function in the way they do. Students will be able to identify and</p>	<p><b>Confidence</b></p> <p><b>Reflective</b></p> <p><b>Resilience</b></p> <p><b>Responsible</b></p> <p><b>Curious</b></p> <p><b>Creative</b></p>		<ul style="list-style-type: none"> <li>• Marking out</li> <li>• Cutting</li> <li>• Finishing</li> <li>• Preparing</li> <li>• Shaping</li> <li>• Drilling</li> <li>• Turning</li> <li>• Brazing</li> <li>• Joining</li> <li>• Filing</li> </ul>	



	<ul style="list-style-type: none"> <li>Identify features of engineered products that meet requirements of a brief: Students must be able to use engineering processes &amp; forming processes</li> <li>Use engineering processes in production of engineered products: Student must be able to use engineering equipment</li> <li>Use tools in production of engineering products</li> <li>Use equipment in production of engineering products</li> </ul>	<p>understand how and why parts work and don't work well together.</p> <p>Through identification methods students will be able to recognise the processes involved to manufacture products and have an understanding the many processes may be involved to make one product.</p>			<ul style="list-style-type: none"> <li>Soldering Requirements</li> <li>Aesthetic</li> <li>Environment (where used)</li> <li>User/customer/client</li> <li>Cost</li> <li>Safety</li> <li>Ergonomics</li> <li>Size</li> <li>Limits</li> <li>Sustainability</li> </ul>	
2a	<p>Students must understand properties of engineering materials</p> <ul style="list-style-type: none"> <li>Describe properties required of materials for engineering products</li> <li>Explain how materials are tested for properties:</li> <li>Select materials for a purpose</li> </ul>	<p>Again building upon ks3 knowledge , students will widen their knowledge of material and properties by linking them to the role that they have to play when used in machines and products.</p> <p>Part of the course focus is on building products and having an understanding for the range of drawings</p>			<ul style="list-style-type: none"> <li>Structural, e.g. buildings, bridges</li> <li>Mechanical, e.g. gearbox, crane, bicycle</li> <li>Electronic, e.g. mobile phone, communications, alarm</li> <li>Properties</li> <li>Tensile strength</li> <li>Hardness</li> <li>Toughness</li> </ul>	<p><b>Exercises using the engineering exercise book P43</b></p>



	<p>Student must be able to interpret engineering information</p> <ul style="list-style-type: none"> <li>• Interpret engineering drawings</li> <li>• Interpret engineering information</li> <li>• identify resources required</li> <li>• Sequence required activities:</li> </ul>	<p>produced from basic oblique, to isometric, assembly and orthographic projections.</p> <p>Students will be able to interpret, identify, use and design their own drawings to support future projects.</p>			<ul style="list-style-type: none"> <li>• Malleability</li> <li>• Ductility</li> <li>• Conductivity</li> <li>• Corrosive resistance</li> <li>• Environmental degradation</li> </ul> <p>Elasticity</p> <ul style="list-style-type: none"> <li>• Destructive tests</li> <li>• Non-destructive tests</li> </ul> <p>Materials</p> <ul style="list-style-type: none"> <li>• Ferrous</li> <li>• Non-ferrous</li> <li>• Thermoplastics</li> <li>• Thermosetting plastics</li> <li>• Smart Composite</li> </ul>	<p>Exercises using the engineering exercise book P33</p> <p>Exercises using the engineering exercise book P43-59</p> <p>Student revision guide and show my homework quizzes</p> <p>Exam papers/ topics students are weak in compare with PLC's</p>
2b	<p>Students must understand properties of engineering materials</p> <ul style="list-style-type: none"> <li>• Describe properties required of materials for engineering products</li> <li>• Explain how materials are tested for properties</li> </ul>	<p>Students will be able to apply their knowledge of materials and properties to support their unit 1 coursework to design and plan for a charger plug-using a variety of product analysis techniques SWOT</p>	<p><b>Confidence</b> <b>Reflective</b> <b>Resilience</b> <b>Responsible</b> <b>Curious</b> <b>Creative</b></p>			<p>Exercises using the engineering exercise book P43-59</p>



	<ul style="list-style-type: none"> <li>Select materials for a purpose: Convert between isometric sketches and 3rd angle orthographic projections</li> <li>Preparation for the Exam</li> <li>Understand effects of engineering achievements</li> <li>understand properties of engineering materials</li> <li>know forming processes of engineering materials</li> <li>be able to solve engineering problems</li> </ul>	<p>and ACCESS FM and PMI they will be able to identify primary and secondary features which define the product they are researching and then redesign to improve the overall look and function of the part/product.</p>				<p>Student revision guide and show my homework quizzes</p>
<p><b>3a</b></p>	<p>Students will sit the Unit 3 assessment Task (External Exam). This is the first opportunity for the students to attempt the exam. By this stage of the course students will have covered the majority of the theory element of the course. Further revision sessions can be completed at the teacher's discretion.</p>	<p>Yr 10 students will opt early for their Unit 3 exam – this will test their ability in a wide range of disciplines which require them to solve engineering problems – be able to know and explain a range of industrial processes and explain how materials and their properties are utilised to mark specific products.</p>	<p><b>Confidence</b> <b>Reflective</b> <b>Resilience</b> <b>Responsible</b> <b>Curious</b> <b>Creative</b></p>			<p>Exam papers/ topics students are weak in compare with PLC's</p>



	<p><i>There will be a RESIT opportunity in Year 11 (June) for all pupils.</i></p>					
<p><b>3b</b></p>	<p><b><u>Student must be able to propose design solutions</u></b></p> <ul style="list-style-type: none"> <li>· <i>Develop creative ideas for engineered products</i></li> <li>· <i>Evaluate options for design solutions</i></li> <li>· <i>Produce design specifications</i></li> </ul> <p><b><u>Students must know how engineered products meet requirements</u></b></p> <ul style="list-style-type: none"> <li>· <i>Identify features that contribute to the primary function of engineered products:</i></li> <li>· <i>Identify features that contribute to the primary function of engineered products</i></li> <li>· <i>Identify features of engineered products that meet</i></li> </ul>	<p>UNIT 1 ASSESSMENT TASK</p> <p>Portfolio based assessment task. Students will complete their first assessment task They will complete a portfolio based task completing approximately 7/8 pages demonstrating the skills learnt from previous lessons.</p>	<p><b>Confidence</b> <b>Reflective</b> <b>Resilience</b> <b>Responsible</b> <b>Curious</b> <b>Creative</b></p>			<p>Exam papers/ topics students are weak in compare with PLC's</p> <p>Portfolio guidance information and preparation drafting work</p>



*requirements of a brief:*

- *Describe how engineered products function*

**Student must be able to propose design solutions**

- *Develop creative ideas for engineered products*

- *Evaluate options for design solutions*

- *Produce design specifications:*

- *Students will complete their first assessment task They will complete a portfolio based task completing approximately 7/8 pages demonstrating the skills learnt from previous lessons.*

*Further resources can be sourced from the WJEC Engineering Specification and Teacher Guidance Notes.*



**Impact:** *What will students have gained from completing this scheme of learning? What difference is your curriculum making? How will it enable them to access the next phase of study? How will your curriculum support the development of future thinking for our students in terms of their career? How will you link your curriculum to careers? Are there opportunities within your curriculum to embrace local businesses, bringing them in for example?*

*By the end of this year students will have potentially cover 2/3rds of their course. By allowing students to sit the exam early in year 10 (if option is still available)it focusses them towards their target grades and potential to aim high. Students through the wide range of activities will be able to prepare well for the 2 assessed pieces of coursework in year 10 Unit1 and until 3. Year 11 provides scope for a resit and further revision of the topics if required cementing their knowledge even further. Year 11 then focuses on Unit 2 understanding, interpreting and planning then produce a manufactured product using detailed drawings to support them*