

<u>Timeline</u>	<u>Topic</u>	<u>Key concepts and knowledge</u>	<u>Skills development</u>	<u>Rationale</u>
YEAR 11 Engineering Design				
Y11 - half term 1	R038 and R040 Stakeholders, qualitative and quantitative data, evaluation techniques, manufacturing methods	<ul style="list-style-type: none"> Stakeholders, needs and wants Specifications Scales of production Methods of evaluating designs Manufacturing - Wasting processes Manufacturing - Shaping and forming Manufacturing – additive manufacture Assembly methods permanent and non-permanent 	<ul style="list-style-type: none"> Writing detailed design specifications Identifying user and product needs Working on R039 NEA Task 1 and 2 Evaluate a range of designs for suitability using evaluation methods (Matrices and QFD) Be able to decide what materials and manufacturing methods would be suitable for a given product. 	This new course builds on the skills learnt throughout KS3 and year 10 engineering. R038 is the theory unit that underpins R039 and R040 and all the NEA tasks. As such the units are taught alongside each other. The knowledge for R038 will be assessed during the NEA but also an external terminal exam in Summer term. During this term students will recap prior learning about design briefs and specification's and delve deeper into understanding product wants or needs and how these influence product development. Students will learn a variety of evaluation techniques to help bring a successful design to market.
Y11 – half term 2	R038 Production costs R040 -NEA product analysis product disassembly	<ul style="list-style-type: none"> ACCESSFM for product analysis Analysing existing designs Methods to disassemble/assemble products Health and safety Planning Materials and manufacturing methods selection for given products 	<ul style="list-style-type: none"> Use critical analysis skills to evaluate given products looking for strengths and weakness in designs and how they meet user and stakeholder needs Disassemble products in a safe manner and re-assemble them Identify what materials have been used to manufactured a product and suggest why they have been chosen Identify how a given product has been manufactured and why this method has been chosen. 	This section again build on work in KS3 and KS4 to deepen knowledge and enable students to evaluate existing products by disassembly which contributes evidence towards the NEA assessment.

<p>Y11 – half term 3-4</p>	<p>R040 -NEA Virtual modelling (CAD) assembly</p> <p>Physical prototype modelling</p>	<ul style="list-style-type: none"> • Modelling methods – virtual and physical • Identification hazard, risk and control measures • Prototype manufacturing methods • Material selection • Evaluating methods 	<ul style="list-style-type: none"> • Solid works modelling and assembly skills to produce virtual prototypes • Carry out a detailed process risk assessment • Plan the manufacture of a physical prototype • Work safely to manufacture a physical prototype to given sizes • Select appropriate material and manufacturing method to produce a physical prototype • Critical analysis and evaluation skills to identify areas for improvements 	<p>The final section is to build on knowledge gained in KS3 and year 10 to use CAD (Solidworks) to create virtual prototypes. Students will then need to select their own materials and manufacturing methods to produce a physical prototype. All practical work must be fully risk assessed and the manufacturing process planned. The final prototype must be tested and evaluated against the specification and user needs. R040 NEA assessment is submitted in May to the exam board for external assessment. The remainder of the term is continuing working on R038 (theory) which prepares students for the summative exam in yr11</p>
<p>Y11 – half term 5</p>	<p>R038 – Exam preparation</p>	<ul style="list-style-type: none"> • Revisit all theory taught in year 10 and year 11 for application into the exam element worth 40% of the overall course 	<ul style="list-style-type: none"> • Exam techniques • Application of knowledge 	<p>This term will be used to visits and strengthen students existing knowledge of the subject and prepare them for the examination in summer 2023.</p>