

## KS4 – Year 11 – Engineering

Term	Topic Titles	Brief Overview
<b>1</b>	<i>Unit R040: Designing skills for NEA</i>	<i>During term 1 students prepare to complete R040 Designing Skills for NEA project. students produce a Mock NEA to enable an understanding of expectation in their coursework. The 3 topics are outlined as follows:</i>
	Topic area 1: Product evaluation	<ul style="list-style-type: none"> <li>● Product analysis and product comparison .</li> <li>● Product disassembly with an analysis of individual components</li> <li>● Ranking matrices- recap</li> <li>● Manufacturing processes, scales of production, assembly methods and maintenance</li> </ul>
	Topic area 2: Modelling design ideas.	<ul style="list-style-type: none"> <li>● Virtual CAD modelling-recap</li> <li>● Physical modelling</li> <li>● Evaluation of final product comparing to initial specification</li> <li>● Potential improvements of products.</li> </ul>
	Commencement of NEA R040	Designing skills 30% of course. <ul style="list-style-type: none"> <li>● students receive a design scenario from the exam board and apply drawing skills previously learnt.</li> <li>● Product analysis of 4 existing products linked to the design scenario using ACCESS FM</li> <li>● Strengths and weaknesses identified for each product</li> <li>● Ranking matrix</li> </ul>
<b>2</b>	Completion of NEA Unit R040 Deadline: February half term.	Designing skills 30% of course. <ul style="list-style-type: none"> <li>● Product Disassembly, Risk assessment and component analysis</li> <li>● Virtual CAD modelling from an orthographic drawing</li> <li>● Planning for physical modelling through the creation of a production plan</li> <li>● Physical modelling</li> <li>● Evaluation of model comparing to specification</li> <li>● Identification of potential improvements</li> </ul>
	R038: Topic area 2 Design requirements	<ul style="list-style-type: none"> <li>● Types of criteria included in an engineering design specification               <ul style="list-style-type: none"> <li>○ Needs and wants for a product</li> <li>○ Production of a design specification</li> <li>○ Manufacturing</li> </ul> </li> <li>● How manufacturing consideration affect design               <ul style="list-style-type: none"> <li>○ Scales of production</li> <li>○ Material availability</li> </ul> </li> </ul>

		<ul style="list-style-type: none"> <li>○ Types of processes</li> <li>○ Production costs</li> <li>● Influences on engineering product design <ul style="list-style-type: none"> <li>○ Market pull and technology push</li> <li>○ Cultural and fashion trends</li> <li>○ Standards and legislation</li> <li>○ Sustainable design and circular economy</li> </ul> </li> </ul>
	R038: Topic area 3 communicating outcomes	<ul style="list-style-type: none"> <li>● Types of drawing used in engineering <ul style="list-style-type: none"> <li>○ 2D and 3D sketching and drawing techniques</li> <li>○ Technical drawings</li> </ul> </li> <li>● Working drawing <ul style="list-style-type: none"> <li>○ Drawing annotation and abbreviations</li> <li>○ Representation of mechanical features on drawings</li> <li>○ Using CAD drawing software</li> </ul> </li> </ul>
	R038: Topic area 4 Evaluating design ideas	<ul style="list-style-type: none"> <li>● Methods of evaluating design idea <ul style="list-style-type: none"> <li>○ Production of models</li> <li>○ Qualitative comparison with brief and specification</li> </ul> </li> <li>● Modelling methods</li> <li>● Methods of evaluating a design outcome <ul style="list-style-type: none"> <li>○ Measuring methods and testing the functionality of the product</li> <li>○ Quantitative comparison with the design brief and specification</li> <li>○ User testing</li> <li>○ Modification and improvements</li> </ul> </li> </ul>
<b>3</b>	Revision and Exam skills	<i>Revision will cover all aspects of the course</i>