

Timeline	Topic	Key concepts and knowledge	Skills development	Rationale
<b>YEAR 10 Engineering Design</b>				
<b>Y10 - half term 1 and 2</b>	R038 The designing process Sketching and drawing, CAD  R039 Sketching and drawing design ideas	<ul style="list-style-type: none"> <li>Design strategies</li> <li>Stages of cyclic design cycle</li> <li>Ergonomics and anthropometrics</li> <li>Freehand sketching ideas</li> <li>Types of drawings</li> <li>Types of manual freehand drawing</li> <li>Scale, dimensions</li> <li>Material choices</li> </ul>	<ul style="list-style-type: none"> <li>Design briefs</li> <li>Types of research</li> <li>Specifications</li> <li>Analysing existing products</li> </ul> <p>Creating drawings</p> <ul style="list-style-type: none"> <li>Oblique</li> <li>Thick thin lines</li> <li>Two point perspective</li> <li>Rendering - Shade, tone, hue, texture</li> <li>Labels and annotation</li> </ul> <p>Working on R039 NEA Task 1 and 2</p>	This new course (from teaching 2022 onwards) builds on the skills learnt throughout KS3. The start of the course is a general overview into a variety of design strategies that engineers can use to create successful products before looking at the different ways designer communicate their ideas to others. The practical element of this term revisits KS3 and deepens knowledge enabling students to create a variety of drawings using freehand techniques such as oblique, perspective and rendering
<b>Y10 – half term 3 and 4</b>	R039 Communicating design ideas - drawing	<ul style="list-style-type: none"> <li>Features of working drawings</li> <li>Standard conventions for working drawings</li> </ul>	<p>Creating working drawings</p> <ul style="list-style-type: none"> <li>third angle orthographic drawing using standard conventions</li> <li>isometric drawings</li> <li>sectional and exploded views</li> <li>Parts lists</li> </ul> <p>Working on R039 NEA Task 3</p>	This section again build on work in KS3 to deepen knowledge and enable students to effectively create working drawings to communicate their design ideas which contributes evidence towards the NEA assessment.
<b>Y10 – half term 5 and 6</b>	R039 Communicating design ideas- drawing  R038 Influences on engineering product design  Make, model and evaluate virtual and physical prototypes	<p>Modelling methods – virtual and physical</p> <ul style="list-style-type: none"> <li>Impact of legislation of the design of products</li> <li>British standards and UKCA</li> <li>Market pull &amp; technology push</li> <li>Planned obsolescence</li> <li>6R's of sustainability</li> <li>Design for a circular economy</li> <li>Reasons for modelling</li> <li>Virtual and physical prototypes</li> </ul>	<ul style="list-style-type: none"> <li>Use of Computer Aided Design (Solidworks to create 3D models</li> </ul> <p>Working on R039 NEA Task 4. Hand in NEA for final assessment, moderation and send to exam board.</p> <ul style="list-style-type: none"> <li>Modelling in 3D CAD and simulating</li> <li>Physical modelling in block and card</li> <li>Bread boarding (electronic circuit modelling)</li> <li>3D printing</li> <li>Evaluating the success of a prototype</li> </ul>	The final section is to build on knowledge gained in KS3 about using CAD (Solidworks) to create 3D models. Students will deepen knowledge to create their own design models in CAD contributing to their NEA assessment. NEA assessment is submitted in Mat 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 and the new NEA task for R040 – design evaluation and modelling.