

KS4 – Year 10 – Engineering

Term	Topic Titles	Brief Overview
1	Unit R039: Designing skills for NEA	<p><i>During term 1 students prepare to complete R039: Communicating Designs NEA project. students produce a Mock NEA to enable an understanding of expectation in their coursework.</i></p> <p><i>The 3 topics are outlined as follows:</i></p>
	Topic area 1: Manual production of freehand sketches in both 2D and 3D.	<ul style="list-style-type: none"> ● Freehand drawing in 2D and 3D using crating and compound shapes. ● To learn a range of rendering and presentation skills to enhance sketched designs. ● Annotation and labelling techniques learnt to ensure designs are fully explained and evaluated.
	Topic area 2: Manual production of Engineering drawings.	<p>Students learn how to produce a range of accurate engineering drawings for their chosen product.</p> <ul style="list-style-type: none"> ○ Orthographic projection ○ Isometric drawing ○ Exploded Isometric ○ Sectional.
	Topic area 3: Use of computer-aided design (CAD)	<p>Students learn how to use 3D CAD software Onshape and SketchUp to create 3D virtual models of their design ideas.</p>
2	Completion of NEA R039	<p>Completion of NEA Unit R039, Communicating Designs. 30% of course.</p> <ul style="list-style-type: none"> ● students receive a design scenario from the exam board and apply drawing skills previously learnt. <ul style="list-style-type: none"> ○ 2D/3D drawing and presentation skills to create a range of initial design ○ Labelling and annotation skills to ensure design ideas are appropriately explained ○ Ranking Matrices to evaluate and compare initial ideas to the design scenario ○ Engineering technical drawings to explore in more detail how an design will be manufactured ○ 3D Computer modelling skills to create a functioning virtual model exploring shape and material texture.
3	Unit R038 Principle of engineering design, Topic area 1, Designing processes	<p>R038 topic areas</p> <ul style="list-style-type: none"> ● Design styles: Linear, iterative, user centred, inclusive, ergonomic and sustainable design. ● Types of research: Primary and secondary research, product analysis, product disassembly, process planning ● Production of an engineering design specification ● Generating a range of design ideas ● Selection and justification of chosen designs ● Presentation of chosen designs

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| | | <ul style="list-style-type: none">● Virtual and physical modelling● Optimise (make) and Error proofing● Evaluation and testing of design ideas |
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