

Year 1	Knowledge and Skills	Vocabulary, Reading and Numeracy	Checking of understanding	Rationale
Autumn Term	<p>Unit 1 (Mathematics) - A1 Algebraic methods. The following is included:</p> <ol style="list-style-type: none"> 1. Indices and logarithms 2. Application to problems involving exponential growth and decay 3. Factorisation and quadratics 4. roots of an equation, including quadratic equations with real roots by factorisation, and by the use of formula. <p>Unit 1 (Physics) - E1 Static and direct current electricity - factors affecting resistance, including conductor length, cross sectional area, resistivity, and temperature coefficient of resistance. Also, factors affecting capacitance, including plate spacing, plate area, permittivity</p> <p>E2 Direct current circuit theory – Ohms law, power, efficiency, Kirchoffs Laws, Charge, voltage, capacitance and energy stored in capacitors</p> <p>E3 Direct current networks - DC power sources, including cells, batteries, stabilised power supply, photovoltaic cell/array and internal resistance. Resistors and capacitors in series and parallel.</p>	<p>Key reading identified in course text book.</p> <p>Course handbook provided further understanding</p> <p>Numeracy is covered extensively throughout Unit 1</p> <p>Summary checklists provided for some controlled assessments</p>	<p>Weekly Homework's</p> <p>Key reading</p> <p>Folder checks</p> <p>Mock task tests</p> <p>Controlled assessment</p>	<p>Unit 1 (120GLH) Students will encounter a wide range of mathematics and physics-based challenges within the engineering sector. The unit explores the basic principles within engineering context to provide the platform required to access higher education and apprenticeship schemes post MV16.</p> <p>Unit 2 (60GLH) This unit explores manufacturing processes most closely associated with engineering sectors. The three Learning Aims cover the following aspects</p> <p>Learning Aim A The scenario-based learning aim provides the knowledge to be able to identify and explain how components could be manufactured via a variety of techniques and scales of production. In essence it enables an engineer to look at a</p>

	<p>F1 Magnetism - electromagnetic induction and applications. Introduced to flux density, magnetomotive force (mmf) and field strength (H), permeability, B/H curves and loops, ferromagnetic materials and reluctance.</p> <p>G1 Single-phase alternating current theory - waveform characteristics, determination of values using phasor and trigonometric representation of alternating quantities, graphical and phasor addition of two sinusoidal voltages</p> <p>Unit 2 (Learning Aim B) Students will be introduced to Learning aim B Develop 2D CAD drawings that can be used in engineering processes. Students will learn how to use Techsoft 2D design software to develop a layered BS8888 orthographic projection. Students will learn how to develop an industry standard BS60617 circuit diagram. Controlled Assessment (Unit 2) - Students will complete the controlled assessment for Learning aim B of Unit 2.</p>			<p>component and suggest how it could be made.</p> <p>Learning Aim B This provides CAD skills to communicate a component via an industry standard drawing system. Students will be able to produce a BS 88 88 orthographic projection as well as an industry level electronic component drawing.</p> <p>Learning Aim C This is a practical based component providing a scenario were team work and management communication skill can be established as well as a range of practical skills. Alongside this - skills in risk assessing and production planning will also be developed</p>
Spring Term	<p>Unit 1 (Mathematics) - A2 Trigonometric methods. The following is included:</p> <ol style="list-style-type: none"> 1. Circular measurements that include Problems involving areas and angles measured in radians. 	Key reading identified in course text book.	Weekly Homework's Key reading Folder checks Mock task tests	

	<p>2. Triangular measurement that include periodic properties of the trigonometric functions</p> <p>3. Mensuration: standard formulae to solve surface areas and volumes of regular solids</p> <p>Unit 1 (Physics) B1 Static engineering systems: Non-concurrent coplanar forces, simply supported beams:</p> <p>B2 Loaded components: direct and shear stress.</p> <p>C1 Dynamic engineering systems: kinetic parameters and principles, dynamic parameters and principles, angular parameters and lifting machines, including inclined planes, scissor jacks and pulleys.</p> <p>D1 Fluid systems: submerged surfaces in fluid systems, immersed bodies, fluid flow in a gradually tapering pipe.</p> <p>Unit 2 (Learning Aim A + C) - Student will be introduced to Learning aims A and C. A - Examine common engineering processes to create products safely and effectively as a team. C – Carryout engineering processes safely to manufacture a product effectively as a team</p>	<p>Course handbook provided further understanding</p>	<p>Controlled assessment</p>	
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<p>Summer Term</p>	<p>Unit 1 Exam Prep</p> <p>Unit 2 Students will build knowledge of practical and machining processes in relation to engineered components. Students will learn to identify how engineered products could be manufactured. Students will understand team dynamics and processes Be able to identify risk and produce industry standard risk assessments Will manufacture a product as part of a team</p> <p>Unit 2 Controlled Assessment Students will complete the controlled assessment for Learning aim A of Unit 2. Students will complete the controlled assessment for Learning aim C of Unit 2.</p> <p>Unit 1 EXAM Students will sit the Unit 1 exam</p>	<p>Key reading identified in course text book.</p> <p>Course handbook provided further understanding</p>	<p>Weekly Homework's</p> <p>Key reading</p> <p>Folder checks</p> <p>Mock task tests</p> <p>Controlled assessment</p>	
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Year 2	Knowledge and Skills	Vocabulary, Reading and Numeracy	Checking of understanding	Rationale
Autumn Term	<p>Unit 3 Students will be introduced to Unit 3 Engineering Product design and manufacture. Students will evolve a range of visual skills to able clear communication of design ideas and solutions. Will be able to recognise and apply key development principles. Understand client need and develop specifications Use statistical analysis and evaluation skills to recognise and develop design opportunities. Students will understand the format of Part A and B of the final examination.</p> <p>Unit 25 Learning Aim A Investigate the microstructures of metallic materials, the effects of processing on them and how these effects influence their mechanical properties</p> <p>Controlled Assessment (Unit 25) Students will complete the controlled assessment for Learning aim A of Unit 25.</p>	<p>Key reading identified in course text book.</p> <p>Unit 3 summary and key marking criteria provided</p> <p>Exemplar texts used.</p>	<p>Weekly Homework's</p> <p>Key reading</p> <p>Folder checks</p> <p>Revision tasks</p> <p>Controlled assessment</p>	<p>Unit 3 (120GLH) This unit is designed to develop engineering design skills. Student will work on engineering scenarios where it is necessary to develop a design solution through ideas development. The scenarios mirror tasks that would easily be replicated within industry. It requires key engineering knowledge and build on the platform of skills developed in Yr12. It also expands wider knowledge related to health and safety as well as sustainability.</p> <p>Unit 25 (60GLH) Is a practical science-based unit focussing key metallurgy principles found within the engineering sector. In this unit, you will investigate and research the microstructures of ferrous and non-ferrous metallic materials. You will also undertake destructive and non-destructive tests on the materials and use the results of the experimentation and research to determine the mechanical</p>
Spring Term	<p>Mock exam (Unit 3) Students to sit Unit 3 mock exam.</p> <p>Unit 3</p>	<p>Key reading identified in course text book.</p>	<p>Weekly Homework's</p> <p>Key reading</p>	

	<p>Students will develop their designing skill through development of a range of set tasks. These will reflect possible scenarios they may meet in the Unit 3 exam</p> <p>Unit 25 Learning aim B Explore safely the mechanical properties of metallic materials and the impact on their in-service requirements</p> <p>Controlled Assessment (Unit 25) Students will complete the controlled assessment for Learning aim B of Unit 25.</p>	<p>Unit 3 summary and key marking criteria provided</p>	<p>Folder checks Revision tasks</p> <p>Controlled assessment</p>	<p>properties of, and suitable applications for, the materials.</p> <p>Finally, you will examine the reasons why components have failed in service and consider possible design improvements that could prevent failure.</p> <p>Learning Aim A This aspect focuses on how microstructures of metallic materials are affected through processing. In essence what happens to metals when you machine and process it?</p>
<p>Summer Term</p>	<p>Unit 3 Exam preparation All activity will be focused on revision and preparation for Unit 3 Part A and Part B.</p> <p>Unit 25 Learning aim C: Explore the in-service failure of metallic components and consider improvements to their design</p> <p>Controlled Assessment (Unit 25) Students will complete the controlled assessment for Learning aim A of Unit 25.</p> <p>Unit 3 EXAM Part A Students will complete activity set for Part A Unit 3 Exam</p> <p>Unit 3 EXAM Part B Students will complete activity set for Part B Unit 3 exam.</p>	<p>Key reading identified in course text book.</p>	<p>Weekly Homework's</p> <p>Key reading</p> <p>Folder checks</p> <p>Revision tasks</p> <p>Controlled assessment</p>	<p>Learning Aim B Will focus how this impacts metals whilst in service. What does this mean for a product when in use and what needs to be considered?</p> <p>Learning Aim C Will consider how metallic structures can fail in service and how this can be improved upon or avoided. In essence if you don't build this into your engineering thinking this could happen.</p>

