

 <p>Level 1 / 2 Technical Award in Engineering</p>	<p>Intent NCFE Engineering gives students a focussed understanding of the ‘world of engineering’, its importance in society as a whole and the role that engineer’s play within it. Students will develop knowledge and understanding of how different engineering disciplines have shaped the world we live in. This qualification will enable students to gain an understanding of how science and maths are applied to engineering solutions and how to read and interpret engineering drawings. There will opportunities for students to explore the properties and characteristics of materials in relation to why specific materials are selected for engineering applications. The learner will understand use of tools and equipment within the engineering industry which will provide engineering and workshop skills in addition to computer aided design and Computer Aided Manufacture.</p>			
<p>Year 10 Subject Focus</p>	<p>Content Areas 1, 2, 3 (September-December)</p>	<p>Mini Make Challenge (December-February)</p>	<p>Content Areas 4, 5 (December-February)</p>	<p>Content Areas 6, 7, 8, 9 (December-July)</p>
<p>Knowledge (facts, information, concepts and key terminology)</p>	<ul style="list-style-type: none"> 1. Engineering disciplines <ul style="list-style-type: none"> 1.1. Engineering disciplines through projects and products <ul style="list-style-type: none"> 1.1.1. Engineering discipline skills 1.2. The health and safety legislation governing engineering <ul style="list-style-type: none"> 1.2.1. Health and safety legislation 2. Applied science and mathematics in engineering <ul style="list-style-type: none"> 2.1. Application of SI units of measurement <ul style="list-style-type: none"> 2.1.1. SI units of measurement 2.1.2. Application of base SI units 2.2. Equations used to calculate energy, force, motion, electrical and geometric shapes <ul style="list-style-type: none"> 2.2.1. Equations for properties 2.2.2. Application of equations 3. Reading engineering drawings <ul style="list-style-type: none"> 3.1. Reading engineering drawings <ul style="list-style-type: none"> 3.1.1. Drawing conventions 3.1.2. British Standards (BS). 	<p>Students will undertake a practice practical project. This will introduce them to several of the content areas and reinforce key theory concepts which have been taught. The content areas which are included are below:</p> <ul style="list-style-type: none"> 2. Applied science and mathematics in engineering 3. Reading engineering drawings 4. Properties, characteristics and selection of engineering materials 5. Engineering tools, equipment and machines 8. Production planning techniques 9. Applied processing skills and techniques 	<ul style="list-style-type: none"> 4. Properties, characteristics and selection of engineering materials <ul style="list-style-type: none"> 4.1. Properties and characteristics of materials <ul style="list-style-type: none"> 4.1.1. Properties 4.1.2. Characteristics 4.1.3. Materials 5. Engineering tools, equipment and machines <ul style="list-style-type: none"> 5.1. Tools, equipment and machines <ul style="list-style-type: none"> 5.1.1. Marking out 5.1.2. Modification 5.1.3. Joining 5.1.4. Finishing 5.2. Safe and correct use <ul style="list-style-type: none"> 5.2.1. Control measures 	<ul style="list-style-type: none"> 6. Hand-drawn engineering drawings <ul style="list-style-type: none"> 6.1. Hand-drawn engineering drawings <ul style="list-style-type: none"> 6.1.1. A freehand sketch 6.1.2. A hand-drafted isometric drawing sheet 6.1.3. A hand-drafted orthographic drawing sheet 7. Computer-aided design (CAD) engineering drawings <ul style="list-style-type: none"> 7.1. CAD engineering drawings <ul style="list-style-type: none"> 7.1.1. A CAD isometric drawing sheet 7.1.2. A CAD orthographic drawing sheet 7.1.3. The uses of CAD 8. Production planning techniques <ul style="list-style-type: none"> 8.1. Production planning <ul style="list-style-type: none"> 8.1.1. Risk assessment 8.1.2. Production plan 9. Applied processing skills and techniques <ul style="list-style-type: none"> 9.1. Skills and techniques <ul style="list-style-type: none"> 9.1.1. Prepare materials 9.1.2. Modify shape and size of materials 9.1.3. Join materials 9.1.4. Finish materials 9.2. Safe and correct use of tools, equipment and machines <ul style="list-style-type: none"> 9.2.1. Preparation and use
<p>Understanding (ability to connect and synthesise knowledge within a context)</p>	<ul style="list-style-type: none"> The learner will understand different engineering disciplines and how their application has solved problems and shaped the modern world through projects and products. The learner will understand the health and safety legislation governing the engineering industry and its purpose. The learner will understand how SI units of measurement are used in engineering products and projects. The learner will understand how equations of SI units are derived from base units and how the unknown factor can be found. The learner will understand how mathematical and scientific equations are used in engineering disciplines to calculate energy, force, motion, electrical and geometric shapes. The learner will understand how equations for properties can be used to evaluate the unknown factor. The learner will understand the British Standard (BS) 8888 for 2D and 3D engineering drawings. 	<ul style="list-style-type: none"> The learner will understand the health and safety legislation governing the engineering industry and its purpose. The learner will understand how SI units of measurement are used in engineering products and projects. The learner will understand the British Standard (BS) 8888 for 2D and 3D engineering drawings. The learner will understand how materials exhibit properties and characteristics in engineering products and projects. The learner will understand health and safety, control measures, and safe and correct use of common tools, equipment and machines used in the engineering industry for manufacturing, including those used for marking out, cutting, modifying, joining and finishing. The learner will understand how to plan a manufacturing task safely and on time. The learner will understand a range of processing skills and manufacturing techniques – preparing, modifying, joining and finishing techniques applied to materials for a manufacturing task. The learner will understand the safe and correct use of tools, equipment and machines. 	<ul style="list-style-type: none"> The learner will understand how materials exhibit properties and characteristics in engineering products and projects. The learner will understand health and safety, control measures, and safe and correct use of common tools, equipment and machines used in the engineering industry for manufacturing, including those used for marking out, cutting, modifying, joining and finishing. The learner will understand the safe and correct use of common tools, equipment and machines used in the engineering industry. 	<ul style="list-style-type: none"> The learner will understand how to produce hand-drawn engineering drawings, apply specific drawing conventions and use layouts recognised within the engineering industry, following British Standard (BS) 8888 (education version). The learner will understand CAD software to produce engineering drawings. The learner will understand the specific drawing conventions and layouts recognised within the engineering industry, following British Standard (BS) 8888 (education version). The learner will understand how to plan a manufacturing task safely and on time. The learner will understand a range of processing skills and manufacturing techniques – preparing, modifying, joining and finishing techniques applied to materials for a manufacturing task. The learner will understand the safe and correct use of tools, equipment and machines.
<p>Skills (successful application of knowledge and understanding to a specific task)</p>	<p>The learner will understand how specific engineering projects and products have shaped the modern world.</p> <p>The learner will know and understand the personal safety measures for each engineering discipline.</p> <p>The learner will be able to use and apply SI units of measurements to products and projects.</p> <p>Be able to apply equations in projects and products.</p>	<p>The learner will practice using of common tools, equipment and machines used in the engineering industry for manufacturing, including those used for marking out, cutting, modifying, joining and finishing.</p> <p>The learner will be able to start to understand how to accurately read engineering drawings and apply this knowledge to the production of their own product.</p>	<p>The learner will be able to apply their knowledge of various tools and processes including marking-out, modification, joining, finishing.</p> <p>In this learning outcome, learners will know and understand the properties and characteristics of materials and why they are selected for engineering products and projects.</p>	<p>The learner will be able to apply systems of measurement, measuring devices, scale and proportion in engineering drawings.</p> <p>The learner will be able to recall properties and characteristics of engineering materials and apply their knowledge of why specific materials are selected for engineering applications.</p> <p>Able to recognise and carry out control measures in both theory and practical situations.</p>
<p>Formal Assessments and Assessment Objectives. (those done by all/vast majority of the cohort)</p>	<p>AO1 - Recall knowledge and show understanding. Recall and communicate the fundamental elements of knowledge and understanding in the above content areas or practical activity. AO2 - Apply knowledge and understanding. The Apply knowledge and understanding to real-world contexts and novel situations in the above content areas or practical activity. AO3 - Analyse and evaluate knowledge and understanding. Develop analytical thinking skills to make reasoned judgements and reach conclusions in the above content areas or practical activity. AO4 - Demonstrate and apply relevant technical skills, techniques and processes. Demonstrate the essential technical skills relevant to the vocational sector by applying the appropriate processes, tools and techniques in the above content areas or practical activity. AO5 - Analyse and evaluate the demonstration of relevant technical skills, techniques and processes. Analyse and evaluate the essential technical skills, processes, tools and techniques relevant to the vocational sector in the above content areas or practical activity.</p>			<p>Assessment 1: will consist of questions from previous NCFE external exam papers covering content from areas 1, 2 and 3. Assessment 2: will consist of questions from previous NCFE external exam papers covering content covered to date. Assessment (written & verbal) will take place at the end of each content area. End of year examination: will include questions on all content areas.</p>
<p>By the end of the year students on course for at least a Level 2 Pass in Engineering will...</p> <ul style="list-style-type: none"> Recall and apply mostly relevant knowledge and understanding in a mostly detailed manner of engineering disciplines, science and mathematics in engineering drawings, properties and characteristics of engineering materials, tools and machinery, hand-drawn and CAD-drawn engineering drawings, product planning techniques and applied skills and techniques. Analyse and evaluate to make mostly reasoned judgements and reach coherent conclusions on engineering disciplines, science and mathematics in engineering drawings, properties and characteristics of engineering materials, tools and machinery, hand-drawn and CAD-drawn engineering drawings, product planning techniques and applied skills and techniques. Safely and effectively demonstrate mostly relevant skills, techniques and processes relevant to engineering when using a wide range of tools and equipment to implement a production plan, applying skills and techniques to a complex engineering piece. Analyse and evaluate their own demonstration of relevant skills, techniques and processes applicable to the sector when planning and preparing completed engineering pieces in a mostly detailed manner. 				