

Subject Area: Design & Technology (option 1 Systems & Control)**Syllabus Code: 4120**

Year 10

All pupils will create a wide range of practical outcomes solving design and make problems across all areas outlined below.

TOPIC	AREAS COVERED	SPECIFIC	TIMESCALE
Core knowledge and understanding	<ul style="list-style-type: none"> ● Design and technology and our world ● Smart materials ● Electronic systems and programmable components ● Mechanical components and devices ● Materials ● Papers & boards ● Natural & manufactured timber ● Ferrous & non-ferrous metals ● Thermoforming & thermosetting polymers ● Fibres and construction of specialist sports fabrics. 	<p>The impact of new and emerging technologies on industry, people, society, the environment, and systems. Developments in modern and smart materials, composite materials and technical fabrics.</p> <p>How energy is generated and stored in order to choose and use appropriate sources to make products and to power systems.</p> <p>How electronic systems provide functionality to products and processes, including sensors and control devices to respond to a variety of inputs, and devices to produce a range of outputs</p> <p>The use of programmable electronic components to embed functionality into products in order to enhance and customise their operation.</p> <p>The functions of mechanical devices, to produce different sorts of movement, changing the magnitude and direction of forces.</p> <p>The categorisation and study of the properties of plastics, woods and metals.</p> <p>A study of special fabrics and fibres such as Kevlar, Gore Tex and Polyester sportswear designed to quickly wick away moisture.</p> <p>The use of CAD/CAM production.</p>	Throughout Year 10
In-depth knowledge and understanding Option 1 Systems & Control	<ul style="list-style-type: none"> ● Electronic systems and programmable components ● Mechanical components and devices 	<p>Students will complete a range of in-depth practical and theoretical investigations into; Electronic systems which include, Digital and analogue circuits. Design and build electronic systems. Using transistors, logic gates, and Programmable integrated circuits. Industrial processes will be used to manufacture circuits and all associated calculations are covered so students can analyse and understand a wide range of Micro and Nano digital</p>	Year 10 and Year 11

		<p>electronics. The use of mathematical formula to calculate Ohm's law, transistor gain.</p> <p>Students will also complete a range of in-depth practical and theoretical investigations into mechanisms.</p> <p>Mechanical systems, Types and uses of a wide variety of mechanical components such as gear, levers, crank & slider, rack & pinion, pulleys, ratchet & pawl etc. The use of mathematical formula to calculate velocity, gear ratio, and moments is expected.</p>	
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Year 11

TOPIC	AREAS COVERED	SPECIFIC	TIMESCALE
Non-Examined Assessment. (This is single coursework project)	<ul style="list-style-type: none"> • Demonstration of knowledge of subject through the completion of a design and make task. • The non-examined assessment will be based on one of three themes chosen by the examination board. 	<p>Component 2: Design and make task</p> <p>Non-exam assessment: Design and manufacture of a fully functioning prototype, which focuses on an area of systems & control. The non-examined assessment will require students to undergo an iterative design process to develop a working prototype product. Students must demonstrate a range of skills within the non-examined assessment including the use of CAD & CAM. The Non-examined assessment is worth 50% of the overall GCSE qualification, approximately 35 hours</p>	<p>Year 11</p> <p>18 - 20 Weeks</p>
Examination Preparation	All areas from the Core knowledge and the In-depth knowledge will be examined	<p>Component 1: Design and Technology in the 21st Century Written examination: 2 hours 50% of overall GCSE qualification</p>	Throughout Year 11