Curriculum Progression Pathway - Design Technology

WJEC Eduqas Level 1/Level 2 GCSE (9-1) in Electronics

Why is the study of Electronics important?

Electronics are all around us. The world that we live in is constantly evolving and technology is at the heart of this change. Only a generation ago you were lucky if your family had a dial phone in their home. Now, everyone has a smartphone capable of incredible things, containing highly complex processors, advanced communications and packed with Electronics. Exciting developments in Electronics mean we can develop innovative products and help transform the way we live; from healthcare to entertainment. In the future, we will see 'smart' cities with transportation, energy consumption, security and water use all improved through Electronics. Electronics enables engineers and inventors to create solutions that tackle the world's problems and to improve lives.

What skills will the study of Electronics teach you?

Studying this GCSE in Electronics enables learners to:

- Develop scientific knowledge and conceptual understanding of the behaviour of analogue and digital electrical/electronic circuits including a wide range of electronic components.
- Develop an understanding of the nature, processes and methods of electronics as an engineering discipline to help them answer questions about practical circuits. Be aware of new and emerging technologies.
- Develop and learn how to apply observational, practical, problem solving and evaluative skills in the identification of needs in the world around them and to propose and test electronic solutions

What will you know and understand from your study of Electronics?

- how to model circuits using CAD software such as Circuit Wizard
- how to build prototypes using breadboard and real components
- how to design and build your own printed circuit boards (PCB's)
- how to test circuits and take a range of measurements using test instruments such as multimeters and oscilloscopes
- how to create systems from subsystems
- how to use a range of components such as resistors, capacitors, IC's, transistors, programmable circuits, diodes, and many more
- how to use logic to solve complex problems
- apply mathematical equations and skills to predict the behaviour of circuits
- how to interface circuits and create sequential systems
- solve problems by creating your own solutions in a design portfolio

How can you deepen your understanding of Electronics?

All students have the option to download and install a student version of Circuit Wizard, which Outwood Academy Portland has purchased on the students behalf. Students are able to build their own circuits and experiment freely and safely by building, testing and simulating circuits digitally.

The world is full of information about new and emerging technologies, whether this be new launches and tech shows to product teardowns and disassembly videos. Many students use their electronics to boost their performance in science and have a greater understanding of computer science concepts. Students can also apply their electronics knowledge to digital music, synthesisers and music production.

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How are you assessed in Electronics?

There are 6 assessment points each year that we term Praising Stars©. We assess how students at their current stage of study are on track to reach their end of stage targets which are formulated on aspirational expectation from their KS2 starting points. We make an informed prediction from our holistic assessments based on our subject mapping of expectation across the Electronics curriculum.

There are 3 Components to the Electronics course:

Components 1 - Discovering Electronics is a written exam and comprises 40% of the qualification. This component covers the following topics: electronic systems and subsystems; circuit concepts; resistive components in circuits; switching circuits; applications of diodes; combinational logic systems

Component 2 - Application of Electronics is also a written exam and comprises 405 of the qualification. This component covers the following topics: operational amplifiers; timing circuits; sequential systems; interfacing digital to analogue circuits; control circuits

Component 3 - Extended system design and realisation task Non-exam assessment (NEA) which comprise 20% of qualification

Key Assessment Objectives

LO1: Demonstrate knowledge and understanding of the ideas, techniques and procedures of electronics

LO2: Apply knowledge and understanding of the ideas, techniques and procedures of electronics

LO3: Analyse problems and design, build, test and evaluate electronic systems to address identified needs

How can Electronics support your future?

The knowledge and skills you will learn and practice throughout the course will help you to progress to Level 3 courses or apprenticeships in electronics or wider engineering areas, such as engineering, process control, systems design, manufacturing, robotics/automation and medical services. The transferrable skills developed by studying electronics are actively sought out by employers. The UK has the 6th largest Electronics industry in the world. The industry has a £98bn annual turnover and contributes 6% of the nation's GDP. This means that Electronic Engineering is one of the most in-demand professions in the country. Therefore, students graduating from Electronics courses are highly sought after by UK employers. These graduates enjoy a full-time employment rate of 78.5% (with a further 11% of graduate engineers going on to postgraduate study), which is much higher than the national average of 57.8%.

Study of Electronics can lead to a wide range of careers:

- Acoustic consultant
- Aerospace engineer
- Broadcast engineer
- CAD technician
- Control and instrumentation engineer
- Design engineer
- Electrical engineer
- Electronics engineer
- Nuclear engineer
- Sound engineer
- Special effects technician

Electronics Course Overview		
Term	**Year 1**	**Year 2**
Autumn 1	Electronic systems and sub-systems	Operational amplifiers / NEA Assignment
Autumn 2	Circuit concepts	Timing circuits
Spring 1	Resistive components in circuits	Sequential systems
Spring 2	Switching circuits	Interfacing digital to analogue circuits
Summer 1	Applications of diodes	Control circuits
Summer 2	Combinational logic systems	