

A-Level Electronics Year 12 Bridging Work

Why study A Level Electronics?

A level Electronics is a subject that you can pick up as a new option in the 6th form if you have enjoyed and done well at GCSE Science, Maths and you may, but not necessarily have studied GCSE Systems in Technology. A level Electronics will open up a wide range of courses post-6th form including Computer Studies, Electrical and Electronic Engineering, Pure Engineering or Applied Science or Applied Physics routes.

Reasons to Study Electronics

- **Help create the future**- 90% of smartphones contain Electronics designed in the UK.
- **Great prospects**- The UK has the 6th largest Electronics industry in the world.
- **High starting salary** - Within 6 months of graduating, those with a degree in Electronics enjoy an average salary of £42,860, which is far above the average starting salary for UK-domiciled graduates in all subjects.
- **Opportunity to travel** - As Electronics plays such a big role across a whole range of technologies and products, collaborations between different designers, manufacturers and producers are often needed.

The purpose of the bridging unit

This work is linked to some of the content that you will cover in the first half term of your Year 12 Electronics. If you have completed GCSE Electronics Products and GCSE Science you will have covered a lot of it before. It is important to bring that GCSE experience into the 6th form. If you haven't completed GCSE electronics I have picked out bits that you will easily find on the internet. It also helps you with that idea of independent learning and how we use it in the 6th form as part of your 6th form

Content

The specification is divided into 3 sections: two written examinations, each worth 40% of the A level and through two coursework tasks which make up the final 20% of the award. All content in the specification should be introduced in such a way that it 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 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 to identify needs in the world and to propose and test electronic solutions
- Progress to Level 4 qualifications or careers in electronics and engineering.



A-Level Electronics at a glance

Principles of Electronics	Application of Electronics	Extended system design and realisation tasks
Written examination: 2 hours 45 minutes 40% of qualification 140 marks	Written examination: 2 hours 45 minutes 40% of qualification 140 marks	Non-exam assessment (NEA) 20% of qualification 70 marks
This component covers the following topics: 1. Semiconductor components 2. Logic systems 3. Operational amplifiers 4. Signal conversion 5. AC circuits and passive filters 6. Communications systems 7. Wireless transmission 8. Instrumentation systems	This component covers the following topics: 1. Timing circuits communications 2. Sequential logic systems 3. Microcontrollers 4. Digital 5. Optical communication 6. Mains power supply systems 7. High power switching systems 8. Audio systems	Task 1: Year 12 (20 marks) – involves the development of a microcontroller system programed through assembler language. Task 2: Year 13 (50 marks) – is a substantial system development including analogue and digital sub-systems in an integrated design.

The tasks that you are about to do will begin to develop some of these attributes and practices:

You will put in about 8-10 hours effort overall, sampling topics covered and practise some of the skills needed. The following tasks are designed to get you to reflect upon some GCSE content that is applicable and to look at skills and the ways that you can work best in Electronics to get the highest possible grade at the end of two years. The final task lets me know about what your plans are after 6th form and how we can support you in your applications for your future studies or entering the world of employment.



By the end of these tasks you will:

- Have demonstrated knowledge and understanding of key vocabulary needed to start your A level Electronics
- Be able to recall, equations and circuit symbols that are common throughout the entire A level course.
- Be able to link real life applications of the course to content that is in the specification and communicate in extended written prose to articulate your thoughts and arguments.

Task 1: Basic Content to refer back to in your introductory unit:

This is an opportunity for you to look back at aspects of Physics from GCSE. Using diagrams, symbols, equations, make a presentation on:

• Electrical current	• Power
• Electrical voltage	• Energy
• Resistance	• Resistors in Series
• Voltage divider	• Resistors in Parallel (might need a bit of research)

Task 2 Applying basic content to real life applications

Research the 6 basic logic gates, NOT, AND, OR NAND, NOR and EXOR.

- For each, draw the correct symbol, its truth table and **explain** how it is designed to work.
- Give real-life example to illustrate how each could be used e.g. a Coffee machine: black coffee AND sugar etc.
- For each one draws an accurate circuit diagram to represent your design.

Task 3: Systems task:

Here the student is tasked with setting themselves up with systems for learning.

- Buy a A4 ring binder folder and subject dividers
- Think about where you work and study best
- Make notes on what worked best for your revision at GCSE in year 10 and 11



Task 4: “Personal development” task:

One of the reasons why so many people like electronics is the fact that it is always changing, and evolving. Pick one area that you are interested in and prepare to present your ideas

You can choose how you present it (A4 essay, PowerPoint presentation, Prezi etc) on such an area ...e.g. developments in mobile phones, what are the next steps and developments?

Task 5 “Vision” task:

Its 2023 the year you sat your GCSEs and started your 6th form studies, now I want you to fast forward 2 years, 5 years and 10 years. What would you like to be doing at each point in that journey, if not 100% sure and you have 2 or 3 ideas put them down. In 6th form we are also about supporting you to make those next steps as much as we are in helping you get the results to make them.

Places to go for help.

1. Educas website is a great place to start.

<https://resources.eduqas.co.uk/Pages/ResourceByArgs.aspx?subId=46&lvlId=1>

- The specification – this explains exactly what you need to learn for your exams.
- Practice exam papers.
- Lists of command words and subject specific vocabulary – so you understand the words to use in exams.
- Practical handbooks explain the practical work you need to know.
- Past papers from the old specification. Some questions won't be relevant to the new AS and A-level so please check with your teacher.
- Maths skills support.
- Web resources page with many links to other resources to support study.

2. The Institute of Electrical and Electronic Engineers

“A single unified voice for biology”. They work with everyone from government policy makers to students, as well as universities and researchers studying biology. <https://www.ieee.org/>

3. The student room

Join the A-level Electronics forums and share thoughts and ideas with other students if you're stuck with your homework. Just be very careful not to share any details about your assessments, there are serious consequences if you're caught cheating. Visit thestudentroom.co.uk

4. Textbooks

The is not a paper text book, but a digital book that will work well with your issued student iPad in September. <https://resources.eduqas.co.uk/Pages/ResourceSingle.aspx?rId=1179>

5. Revision Guide

Educas also have digital resources that can be used on the same link.



6. YouTube

YouTube has thousands of Electronics videos. Just be careful to look at who produced the video and why, because some videos distort the facts. Check the author, date and comments – this helps indicate whether the clip is reliable. If in doubt, ask your teacher.

7. Magazines

See the links below for other resources /help that you may wish to use during your course.

Wider reading:

Books/ magazines:

<https://www.elektormagazine.com/magazine>

<https://www.whsmith.co.uk/magazine-subscriptions/hobby-magazines/electronics-magazine-subscriptions/mag00055/>

<https://www.electronpublishing.com/>

Websites

https://www.edugas.co.uk/qualifications/electronics-as-a-level/#tab_keydocuments

https://www.youtube.com/playlist?list=PLVppgNLuhu-VkvinV2zn7c9jXE6_9dyZW

<https://www.edugas.co.uk/home/past-papers/>

<https://reviseomatic.org/rOmV4/>

<https://www.ieee.org/>

