

Extended Diploma Course Structure - Equivalent in size to three A Levels. 15 units of which 7 are mandatory and 3 are external. Mandatory content (56%). External assessment (33%).

Diploma Course Structure - Equivalent in size to two A Levels - 10 units of which 5 are mandatory and 2 are external. Mandatory content (58%). External assessment (33%).

Summary Purpose - This qualification has been designed as a two-year, full-time course that meets entry requirements in its own right for learners wanting to progress to employment in engineering. Learners gain relevant skills and knowledge from studying a range of content focused on electrical/electronic and mechanical disciplines, for example electrical machines and maintenance of mechanical systems. Progression could be either directly to employment in Level 3 job roles, higher apprenticeship programmes or via higher education courses in engineering.

Curriculum - The curriculum design focuses on delivering a wide range of units that are delivered to the students by specialist teachers, including Engineering Maths, Electronics, Mechanical Engineering, CAD/CAM. The delivery and assessment schedule is a two-year programme including assessment windows and examination dates.

Starting Points - Students who arrive at Brook Sixth Form & Academy for KS5 have all had varied educational experiences at KS4. In regard to their education, consideration is made in the planning and support for all the students. The programme is designed to complete initial baseline work to enable the students to showcase the skills they have so we are able to focus on consolidating these and teaching them the skills they have not experienced to ensure that the students are able to fully access their level 3 course.

Problem Based Learning - The course is designed using an integrated engineering programme to deliver the content of the units through problem-based assignments. The content and knowledge are delivered with contextualised briefs that enable the students to match to real life experiences. Extra curricular projects are delivered that enhance their ability to apply the skills to different situations, to consolidate their learning and give additional learning opportunities to support their assignments.

Links with Industry Partners - The links with industry are being continuously developed to incorporate real world challenges into the curriculum projects but also to use the links to increase the contact of our students with organisations and opportunities to work throughout their course with the wider range of stakeholders that they need to be aware of and to help the students to make decisions of the path they wish to take in the next stages of their education.

Unit	Autumn Term Year 12 Extended Diploma Units and GLH.	Learning Aims, Objectives and Assessment Outcomes.
1	Engineering Principles. 120 GLH - Externally Assessed - 2025 Entry.	AO1 Recall basic engineering principles and mathematical methods and formulae. AO2 Perform mathematical procedures to solve engineering problems. AO3 Demonstrate an understanding of electrical, electronic and mechanical principles to solve engineering problems AO4 Analyse information and systems to solve engineering problems. AO5 Integrate and apply electrical, electronic and mechanical principles to develop an engineering solution.
2	Delivery of Engineering Processes Safely as a Team. 60 GLH.	A Examine common engineering processes to create products or deliver services safely and effectively as a team. B Develop two-dimensional computer-aided drawings that can be used in engineering processes. C Carry out engineering processes safely to manufacture a product or to deliver a service effectively as a team.
3	Engineering Product Design and Manufacture. 120 GLH - Externally Assessed - 2025 Entry.	AO1 Demonstrate knowledge and understanding of engineering products and design. AO2 Apply knowledge and understanding of engineering methodologies, processes, features and procedures to iterative design. AO3 Analyse data and information and make connections between engineering concepts, processes, features, procedures, materials, standards and regulatory requirements. AO4 Evaluate engineering product design ideas, manufacturing processes and other design choices AO5 Be able to develop and communicate reasoned design solutions with appropriate justification.
10	Computer Aided Design in Engineering. 60 GLH.	A Develop a three-dimensional computer-aided model of an engineered product that can be used as part of other engineering processes. B Develop two-dimensional detailed computer-aided drawings of an engineered product that can be used as part of other engineering processes. C Develop a three-dimensional computer-aided model for a thin walled product and a fabricated product that can be used as part of other engineering processes.
25	Behaviour of Metallic Materials. 60 GLH.	A Investigate the microstructures of metallic materials, the effects of processing on them and how these effects influence their mechanical properties B Explore safely the mechanical properties of metallic materials and the impact on their in-service requirements C Explore the in-service failure of metallic components and consider improvements to their design.

Unit	Spring Term Year 12 Extended Diploma Units and GLH.	Learning Aims, Objectives and Assessment Outcomes.
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19	Electronics Devices and Circuits. 60 GLH.	A Explore the safe operation and applications of analogue devices and circuits that form the building blocks of commercial circuits. B Explore the safe operation and applications of digital logic devices and circuits that form the building blocks of commercial circuits. C Review the development of analogue and digital electronic circuits and reflect on own performance.
45	Additive Manufacture – 3D Printing	A Examine the technology and characteristics of additive manufacturing processes as used in industry. B Investigate component design considerations and finishing processes required to effectively use additive manufacturing processes. C Develop a component using additive manufacturing processes safely.

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24	Maintenance of Mechanical Systems. 60 GLH.	A Examine the characteristics of lubricants and their application in mechanical systems. B Investigate the characteristics and applications of common consumable components used in mechanical systems. C Investigate the operation and application of power transmission components used in mechanical systems. D Carry out routine maintenance safely and sustainably to help ensure the continued operation of a mechanical system.

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4	Applied Commercial and Quality Principles in Engineering. 60 GLH.	A Examine business functions and trade considerations that help engineering organisations thrive. B Explore activity-based costing as a method to control costs and to determine if an engineering product or service is profitable C Explore how engineering organisations use quality systems and value management to create value.
5	A Specialist Engineering Project. 60 GLH.	A Investigate an engineering project in a relevant specialist area. B Develop project management processes and a design solution for the specialist engineering project as undertaken in industry . C Under take the solution for a specialist engineering project and present the solution as undertaken in industry.
7	Calculus to Solve Engineering Problems. 60 GLH.	A Investigate an engineering project in a relevant specialist area. B Develop project management processes and a design solution for the specialist engineering project as undertaken in industry . C Under take the solution for a specialist engineering project and present the solution as undertaken in industry.
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6	Microcontroller Systems for Engineers. 120 GLH - Externally Assessed.	AO1 Demonstrate knowledge and understanding of computer coding principles, electronic hardware components and the development process AO2 Apply knowledge and understanding of computer coding principles, electronic hardware components and of the development process to design and create a physical computer system to meet a client brief AO3 Analyse test results and evaluate evidence to optimise the performance of a physical computer system throughout the development process. AO4 Be able to develop a physical computer system to meet a client brief with appropriate justification
8	Further Engineering Maths. 60 GLH.	A Examine how sequences and series can be used to solve engineering problems. B Examine how matrices and determinants can be used to solve engineering problems. C Examine how complex numbers can be used to solve engineering problems. D Investigate how statistical and probability techniques can be used to solve engineering problems.
22	Electronic Printed Circuit Board Design and Manufacture. 60 GLH.	A Examine the design and manufacture of printed circuit boards that are widely used in industry. B Explore how computer software is used for schematic capture and simulation of an electronic circuit. C Develop safely a printed circuit board to solve an engineering problem. D Review the development of the printed circuit board and reflect on own performance.
41	Manufacturing Secondary Machining Processes. 60 GLH.	A Examine the technology and characteristics of secondary machining processes that are widely used in industry. B Set up traditional secondary processing machines to manufacture a component safely. C Carry out traditional secondary machining processes to manufacture a component safely. D Review the processes used to machine a component and reflect on personal performance.

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