# Engineering Design

Cambridge Nationals

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| Course Leader: | Mr C Ellis |
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| Exam Board: | OCR |
| Assessment: | 40% examination, 60% coursework |

**Why should I study this subject at Key Stage 4?**

The world around us is designed in some way. Modern living relies on products and systems created to support how we live. Design comes from the ability to think creatively and to be able to imagine 'what if …?' Some of the greatest human achievements have come from creative design engineering, allowing the realisation of some truly remarkable change in our world. We are surrounded by products that have been created to solve a problem. Design solutions are developed by following a design strategy or the iterative process and gaining an understanding of how products are manufactured to ensure that the ideas can be produced effectively.

**Assessment:**

The course consists of 3 units of study for students to be successful in this course. The course is run over 2 years and consists of a 1 hour and 15 minutes exam, 40% of the grade. In addition, it has 2 mandatory coursework units which are both worth 30% of the final grade. Students will have to submit a portfolio at the end of each unit for submission and these deadlines will be staggered throughout the 2 year course.

Students will have approximately 48 guided learning hours for the exam unit and 36 hours for each of the Non Exam Assessment (coursework) units.

**What does the course involve?**

The Engineering Design course is aimed at developing knowledge, understanding and drawing and digital modelling skills that would be used in the engineering and development sectors. Through a variety of activities the students will develop skills in both 2D and 3D engineering design techniques, designing new products that meet a design brief and communicating design ideas.

These skills will help the students to develop independence and confidence in using skills that can be used in life and work situations, such as; researching, analysis, evaluation and presenting ideas based on evidence. The tasks in the unit will also inform design ideas and will consider problem solving by exploring designing options and finding imaginative solutions through creative thinking.

**What will students study as part of this qualification?**

**Unit 1: Principles of engineering design** - *Exam unit*
Students will learn about the different strategies, the stages involved the design process,

the type of information needed to develop a design brief and specification and the manufacturing considerations that can influence a design. *1 hour and 15 minutes exam, 40% of the grade*

**Unit 2: Communicating designs -** *12-15 hours to complete a portfolio for submission*
Students will learn how to develop techniques in sketching and gain industrial skills in engineering drawing including dimensioning and working to professional standards. They will enhance their confidence and capabilities using Computer Aided Design (CAD) software to produce accurate and detailed drawings and models that visually communicate the designs.

**Unit 3 : Developing and presenting engineering designs -** *12-15 hours to complete a portfolio for submission*
Students will learn how designers can create and test models to develop a working prototype of a design. Developing virtual modelling skills using Computer Aided Design software and possible physical modelling skills to produce a high quality model that will simulate the prototype.

**What knowledge and skills will the student develop and how might these be of use in further studies?**
The Engineering Design course will enable students to learn about the design process, understand how it can be used to design effective solutions for a given design brief. Students will develop the ability to communicate their design ideas through the use of sketches and engineering drawings and computer aided design. The students will also be able to evaluate the design of a product, through the disassembly of existing products or the use of modelling for new designs.

These skills will help progress onto further study in the engineering design and development sector. This may be Level 3 vocational qualifications, such as the Cambridge Technical in Engineering, A Levels, such as A Level Design and Technology, or one of the number of Design and Development Technician Apprenticeships. It is anticipated that these qualifications will also enable the students to progress onto a T Level such as Design and Development for Engineering and Manufacturing, when they are available.