



Why study Engineering ?

This qualification will enable Ratton students to learn about the process of Engineering Design and 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.

They 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 them progress onto further study in the engineering design and development sector.

Specification at a glance



Principles of Engineering Design

EP1 - Designing Processes

EP2 - Designing Requirements

Communicating Ideas

EP3 - Communicating Design Outcomes

EP5 - Manual Production of Freehand Sketches

EP6- Manual Production of Engineering Drawings

EP7 - Computer Aided Design

EP9 - Modelling Design Ideas

Design Evaluation, and Modelling

EP4 - Evaluating Design Ideas

EP8 - Product Evaluation



Please click on the link below for more information

[Cambridge Nationals - Engineering Design](#)
[Level 1/2 – J822 - OCR](#)

Assessment



R038: Principles of engineering design (exam at the end of y11)

In this unit, students will learn about the different design strategies and where they are used, as well as the stages that are involved in iterative design, which is currently one of the most widely used design strategies. They will learn about the type of information needed to develop a design brief and specification, and the manufacturing and other considerations that can influence a design.

Students will develop knowledge of the types of drawing used in engineering to communicate designs, as well as the techniques used to evaluate design ideas and outcomes, including modelling methods.

R039: Communicating designs (NEA completed in y10 – non examined assessment)

In this unit, students will learn how to develop their techniques in sketching, and gain industrial skills in engineering drawing using standard conventions that include dimensioning, line types, abbreviations, and representation of mechanical features.

Students will enhance their confidence and capabilities by using computer aided design (CAD), 2D and 3D software, to produce accurate and detailed drawings and models that visually communicate their designs.

R040: Design, evaluation and modelling (NEA completed in y11 – non examined assessment)

In this unit, students will learn how designers can quickly create and test models to develop a working prototype of a design. They will develop their virtual modelling skills using computer aided design (CAD) 3D software, to produce a high-quality model that will be able to simulate their design prototype.

Students will also develop their physical modelling skills using modelling materials or rapid-prototyping processes to produce a physical prototype.

Assessment

R038: Principles of engineering design 70marks 1 hour 15 mins
Written paper, OCR set and marked

R039: Communicating designs 60marks Approx. 10-12 hours
Centre-assessed tasks, OCR moderated

R040: Design, evaluation and modelling 60marks Approx. 10-12 hours
Centre-assessed tasks, OCR moderated

Exam paper example

The exam paper has two sections –
Section A has ten questions that are multiple choice – something like this -

- 2 Which of these examples describes an advantage of an ergonomic design?
- (a) Bright colours to attract buyers
 - (b) Textured surface for easy grip
 - (c) Universal size so anyone can use it
 - (d) Using sustainable materials to save finite resources [1]
- 3 Which of these is an example of a shaping process?
- (a) Adding aesthetic features to a product
 - (b) Assembling final parts to a product
 - (c) Cutting a thread
 - (d) Injection moulding [1]

5 Fig. 5 shows some common standard components.



Fig. 5

(a) Give **two** benefits to a manufacturer of using standard components in their range of products.

.....

 [2]

(b) Describe why standard components are manufactured to certain tolerances.

.....

 [2]

Section B varies – with about 7-12 questions – they might look like this -

Progression

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 them to progress onto a T Level such as Design and Development for Engineering and Manufacturing, when they are available.



Potential careers



Skills and knowledge

You'll need:

- knowledge of engineering science and technology
- maths knowledge
- design skills and knowledge
- to be thorough and pay attention to detail
- excellent verbal communication skills
- science skills
- analytical thinking skills
- the ability to read English
- you will be expected to use a computer confidently as part of this job.

Aerospace engineer

Aeronautical engineer

Aerospace engineers design, build and maintain planes, spacecraft and satellites.

Average salary
(a year)

£20,000 to £60,000
Starter Experienced

Typical hours
(a week)

39 to 41
a week



Product designer

Industrial designer, 3D designer, prototype designer, inventor

Product designers create new products and improve existing ones.

Average salary
(a year)

£19,000 to £50,000
Starter Experienced

Typical hours
(a week)

40 to 42
a week

Skills and knowledge

You'll need:

- design skills and knowledge
- knowledge of engineering science and technology
- the ability to come up with new ways of doing things
- to be thorough and pay attention to detail
- analytical thinking skills
- persistence and determination
- the ability to use, repair and maintain machines and tools
- thinking and reasoning skills
- you will be expected to use a computer confidently as part of this job.

Jewellery designer-maker

Silversmith

Jewellery designers plan and create jewellery, silverware and other decorative products.

Average salary
(a year)

£16,000 to £50,000
Starter Experienced

Typical hours
(a week)

40 to 42
variable



Skills and knowledge

You'll need:

- the ability to work well with your hands
- to be thorough and pay attention to detail
- customer service skills
- the ability to come up with new ways of doing things
- analytical thinking skills
- the ability to use your initiative
- ambition and a desire to succeed
- physical skills like movement, coordination, dexterity and grace
- being able to use a computer terminal or hand-held device may be beneficial for this job.



Computer games developer

Computer games designer, video games designer

Computer games developers make games for the internet, mobile phones, PCs and games consoles.

Average salary
(a year)

£19,000 to £70,000
Starter Experienced

Skills and knowledge

You'll need:

- analytical thinking skills
- maths knowledge
- to be thorough and pay attention to detail
- the ability to come up with new ways of doing things
- the ability to use your initiative
- persistence and determination
- thinking and reasoning skills
- excellent verbal communication skills
- this job requires a thorough understanding of computer systems and applications.

Electronics engineer

Electronics engineers design and develop systems for industry, from mobile communications to manufacturing and aerospace.

Average salary
(a year)

£21,000 to £65,000
Starter Experienced

Typical hours
(a week)

42 to 44
a week

Skills and knowledge

You'll need:

- knowledge of computer operating systems, hardware and software
- knowledge of engineering science and technology
- maths knowledge
- to be thorough and pay attention to detail
- analytical thinking skills
- design skills and knowledge
- the ability to work well with others
- to be flexible and open to change
- being able to use a computer terminal or hand-held device may be beneficial for this job.



Skills and knowledge

You'll need:

- design skills and knowledge
- to be thorough and pay attention to detail
- knowledge of engineering science and technology
- patience and the ability to remain calm in stressful situations
- knowledge of manufacturing production and processes
- the ability to come up with new ways of doing things
- to be flexible and open to change
- analytical thinking skills
- being able to use a computer terminal or hand-held device may be beneficial for this job.

Model maker

Model makers design and create 3D models for TV and film, and for use in engineering, construction and architecture.

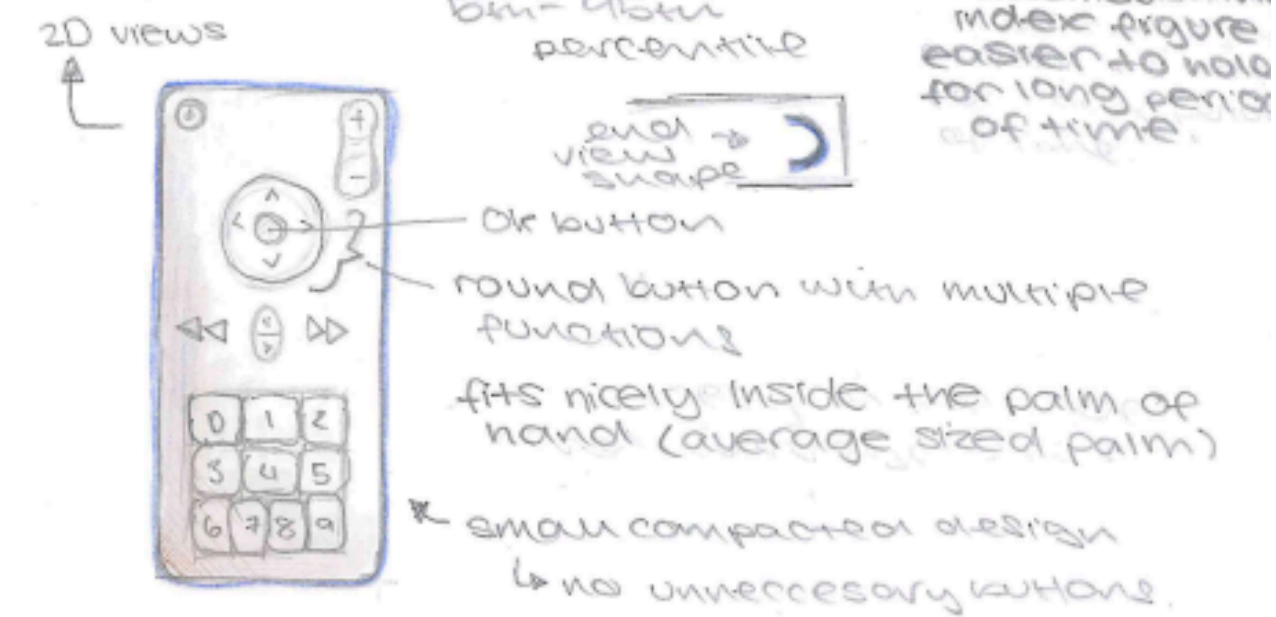
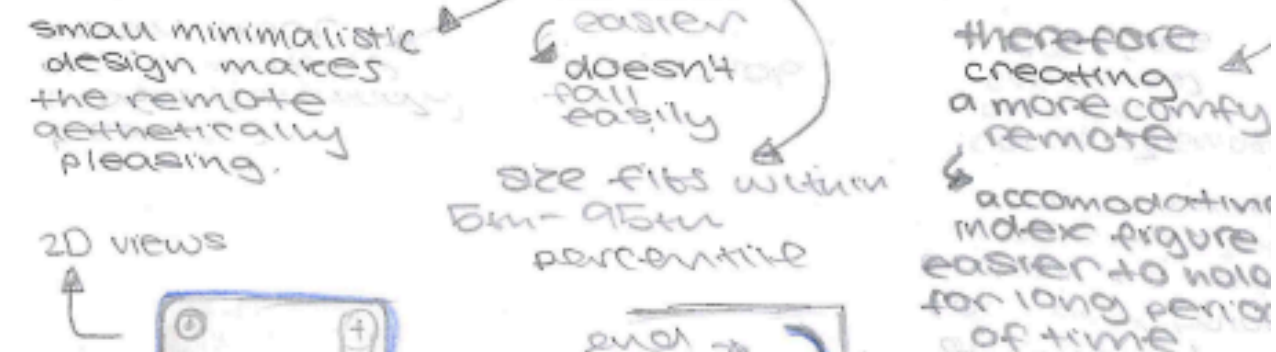
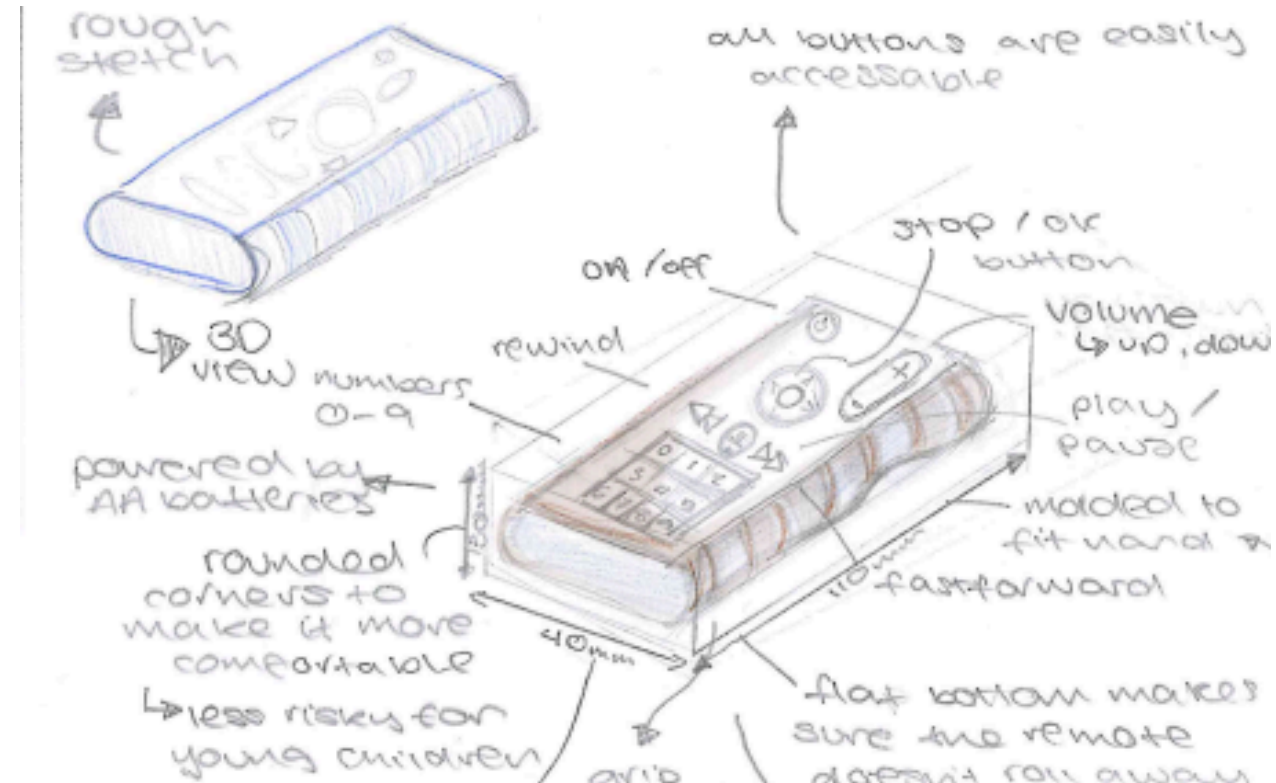
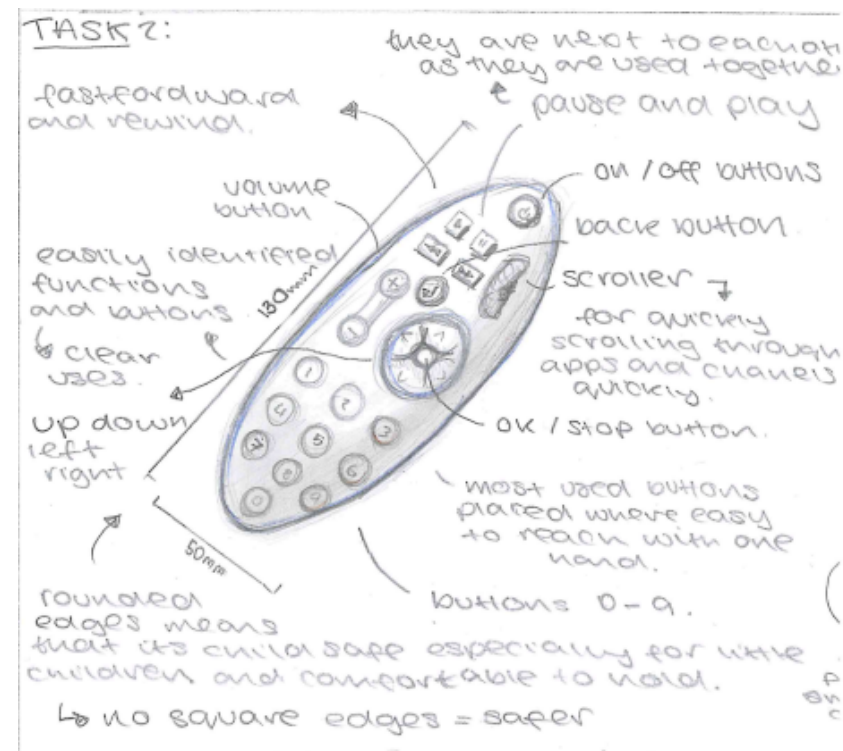
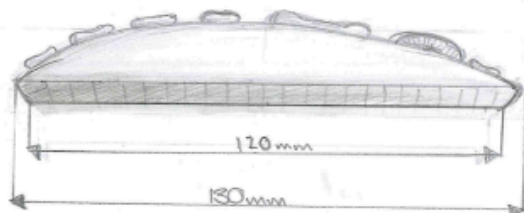
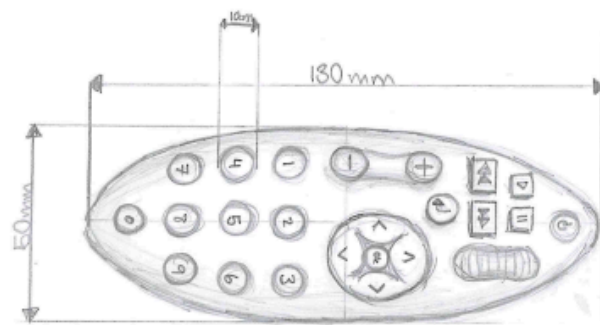
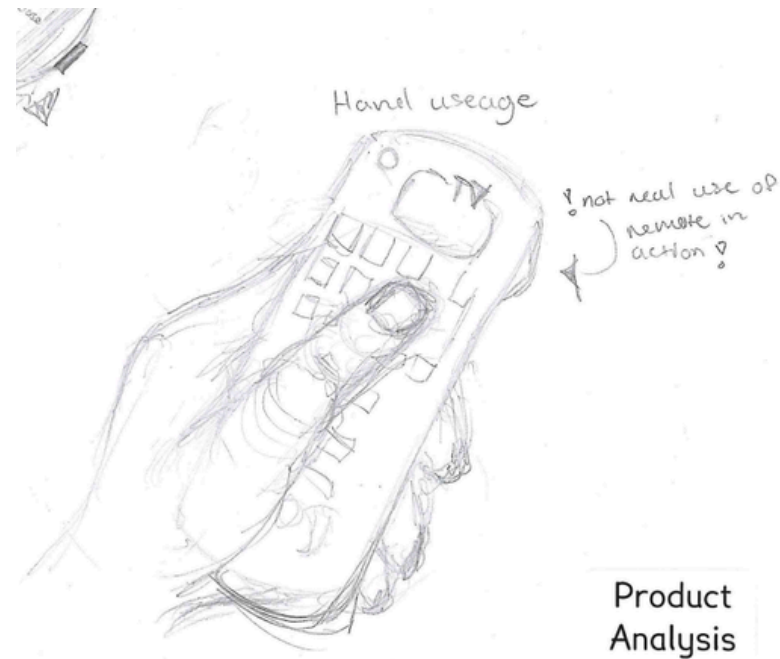
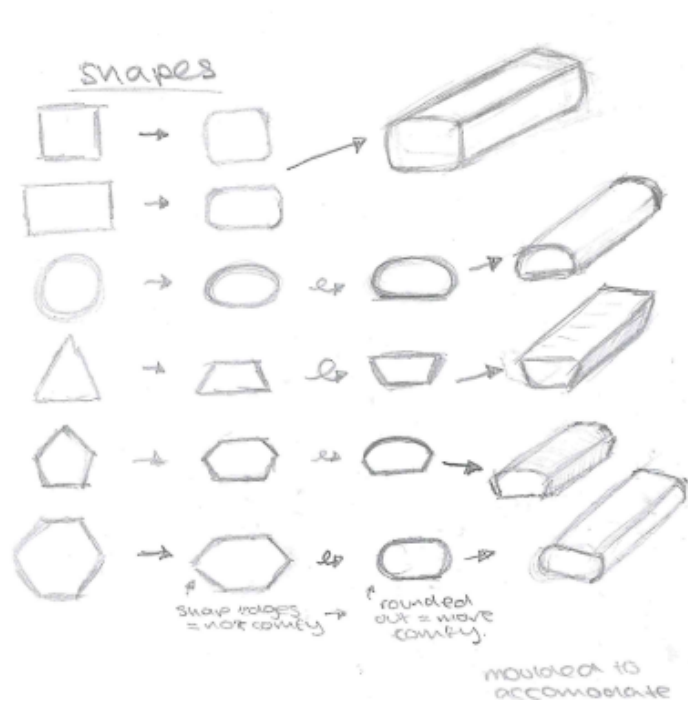
Average salary
(a year)

£16,000 to £30,000
Starter Experienced

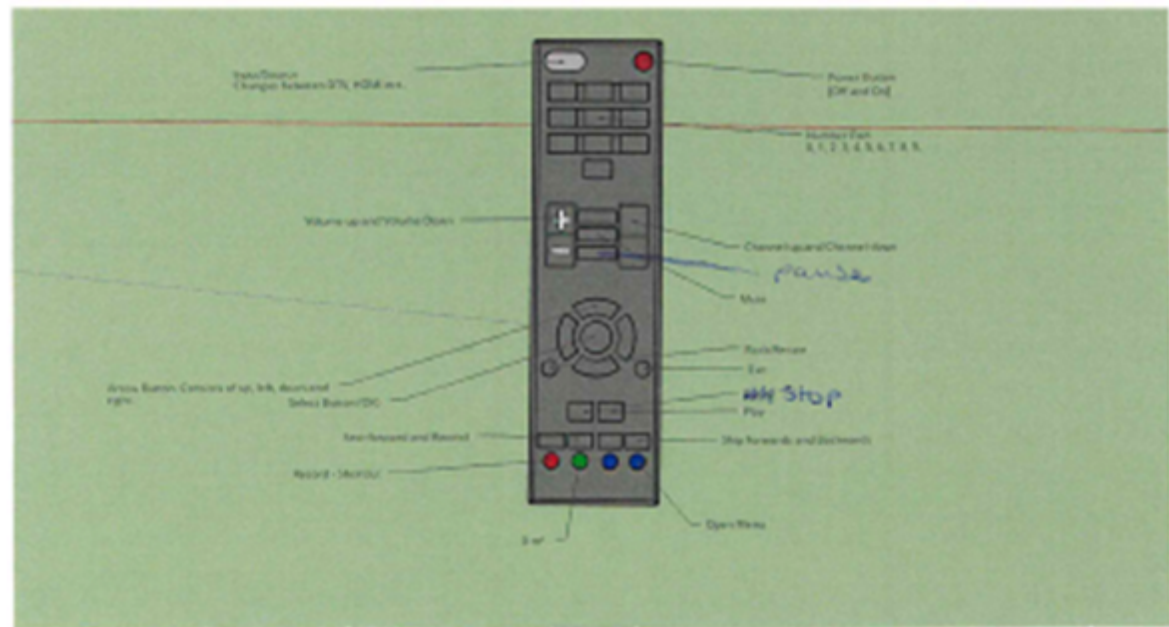
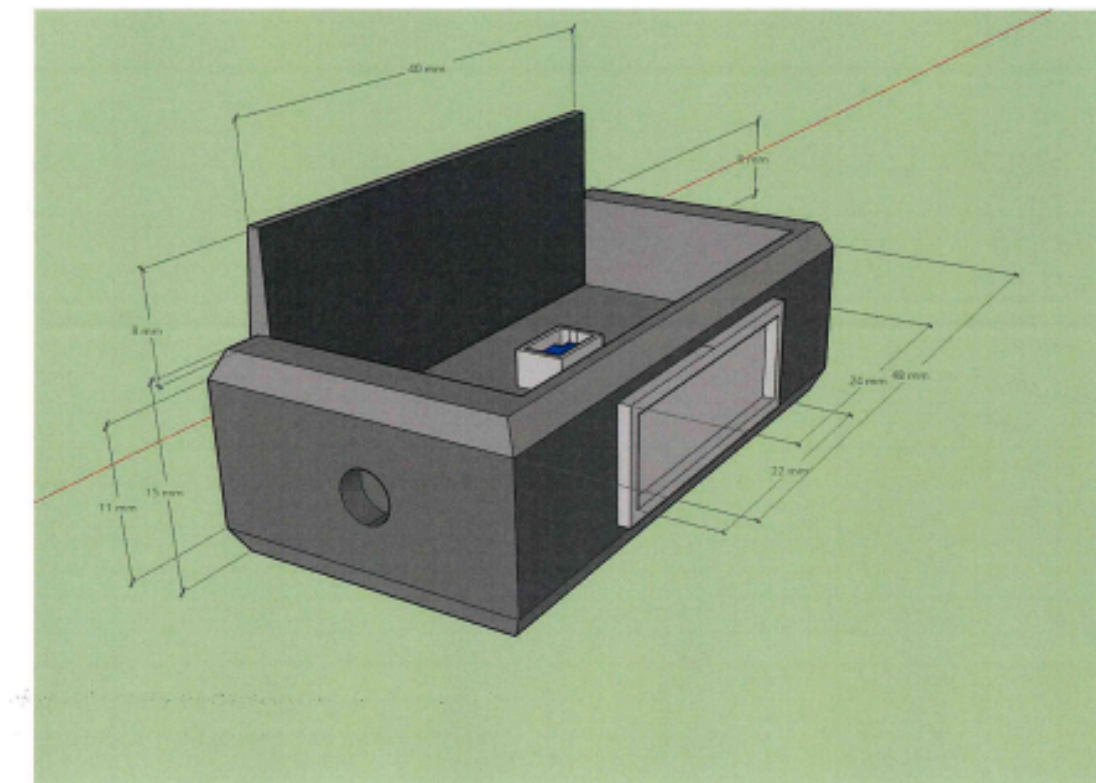
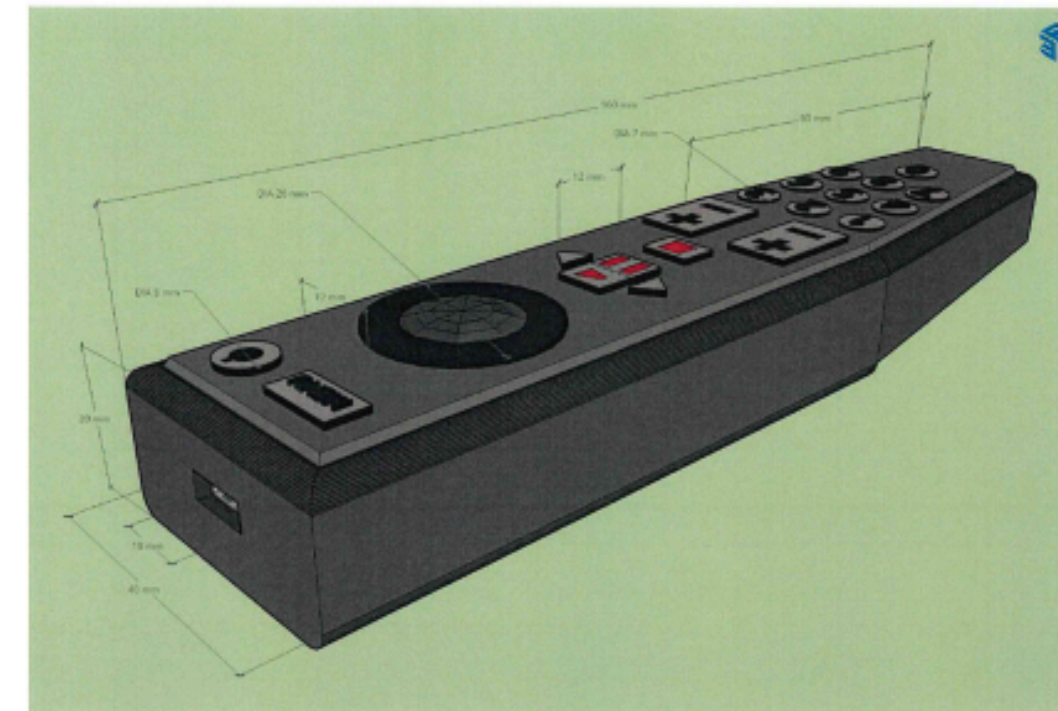
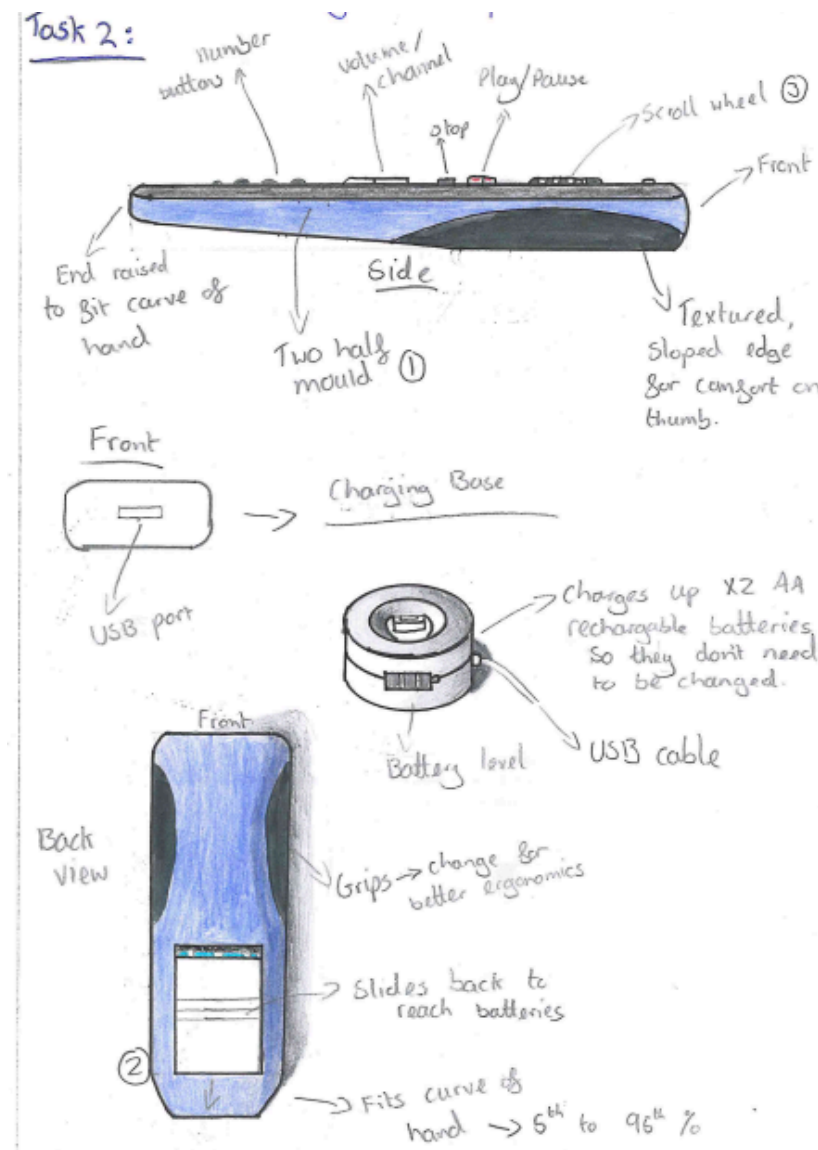
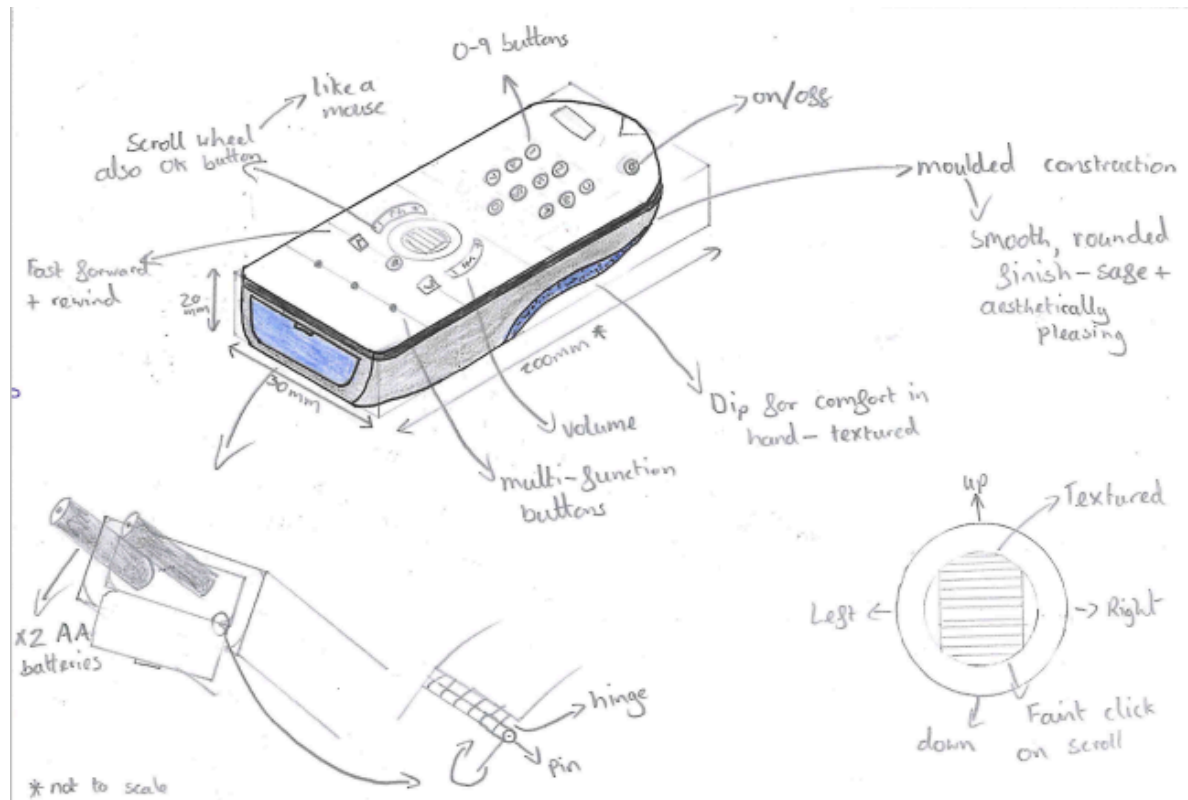
Typical hours
(a week)

43 to 45
variable

Examples of previous year 10 Student Work



Examples of previous year 10 Student Work



Any questions please email:
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Design creates culture

Culture shapes values

Values determine the future