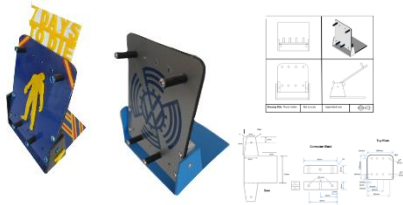


Year 10 Engineering Design Option

Year 10 Engineering Design focuses on the coursework units and examination knowledge required to achieve a qualification. Students will use the skills and knowledge built in year 9 to complete one coursework unit in year 10 (with a further coursework unit completed in yr11) and to develop knowledge and understanding in preparation for the external examination unit taken at the end of year 11. The Cambridge National Engineering Design qualification, equivalent to one full GCSE, consists of two coursework units (accounting for 60% of the qualification) and one external examination (accounting for 40% of the qualification). In year 10, the first coursework unit (R039) focuses on communicating designs. Students will be given a product theme (provided by the examination board), from which they will produce sketched ideas, engineering drawings and Computer Aided Design (CAD) models of a product as a solution to the given theme. Year 10 Engineering Design consists of:

- Focused tasks completed at various stages throughout the year in preparation for completing the first coursework unit and developing examination knowledge.
- Completion of the first coursework unit (R039) – Communicating Designs (30% of the qualification)
- Mock examinations to test theoretical knowledge in preparation for external examination in Year 11.

Focused tasks & projects



Project / task description:

Bottle Opener

Students will use a provided engineering drawing to cut and shape a bottle opener blade from 3mm mild steel. They will then design and style the blade further, and add a design for a handle, then re-draw a new engineering drawing for their own product.

Mobile Phone Holder

Students will manufacture a mobile phone holder from an engineering drawing provided. Students will then use additional materials, CNC vinyl cutters and laser cutters to add further features to their phone holder. Students will create rendered sketches and engineering drawings to create a marketing presentation for their phone holders.

Computer Aided Design (CAD) / Computer Aided Manufacture (CAM)

Students will complete a range of Computer Aided Design (CAD) tasks using different packages, ranging from MS Word, Google-Sketch-Up and Techsoft 2D Design to Solid Works. Students will also use Computer Aided Manufacturing (CAM) equipment such as laser cutters, vinyl cutters and 3D printing.

Coursework Unit (1)

Communicating Designs

OCR
Oxford Cambridge and RSA

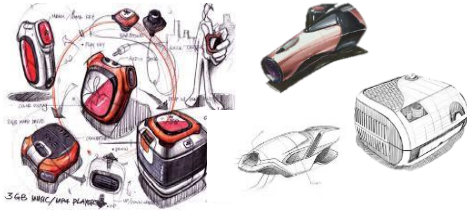
Level 1/Level 2 Cambridge National in Engineering Design

R039 Communicating design

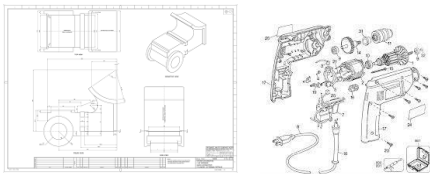
Set Assignment

Scenario Title: Given out in lessons

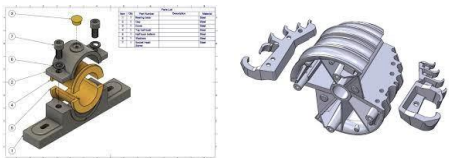
Product Theme & specification



Freehand rendered sketches



Engineering Drawings



CAD Models

Coursework unit Title: R039 - Communicating Designs

Coursework description: This coursework unit set by the examination board (OCR) is mandatory, and accounts for 30% of the course. Students are provided with a product theme and specification. They will start by producing initial hand sketched and rendered design ideas to meet the product specification, and then produce engineering drawings to standard conventions to demonstrate their chosen idea. Students will then use Computer Aided Design to produce models of their final design proposal.

Coursework unit areas:

Topic Area (1)

Production of Freehand sketches (30/60 marks – 50%)

Students will produce a range of hand sketched design proposals in response to the specification requirements for the given product theme. The sketched design ideas will be rendered using different techniques, and annotated to explain design features.

Topic Area (2)

Production Engineering Drawings (12/60 marks – 20%)

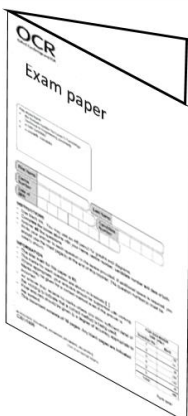
Students will produce a range of engineering drawings to demonstrate their design proposals using standard conventions. Drawings could include 3rd angle orthographic projection, assembly drawings, and exploded views.

Topic Area (3)

Use of Computer Aided Design (CAD) (18/60 marks – 30%)

Students will produce a CAD model of their design proposal, which could show various components and assemblies, including animation.

External examination Content



Exam in
Yr11

40% of
course

1hr
15mins

Description: Students will sit an external examination in Year 11. The examination is 1 hour & 15 minutes, and accounts for 40% of the course, and will test students' knowledge on the principles of Engineering Design. The paper is made of up of two sections.

Section A (10/70 marks) – Multiple choice questions

Section B (60/70 marks) – short & extended written answers

Examination content Topics

Topic Area (1) – Designing Processes

Topic Area (2) – Design Requirements

Topic Area (3) – Communicating Design Outcomes

Topic Area (4) – Evaluating Design Ideas