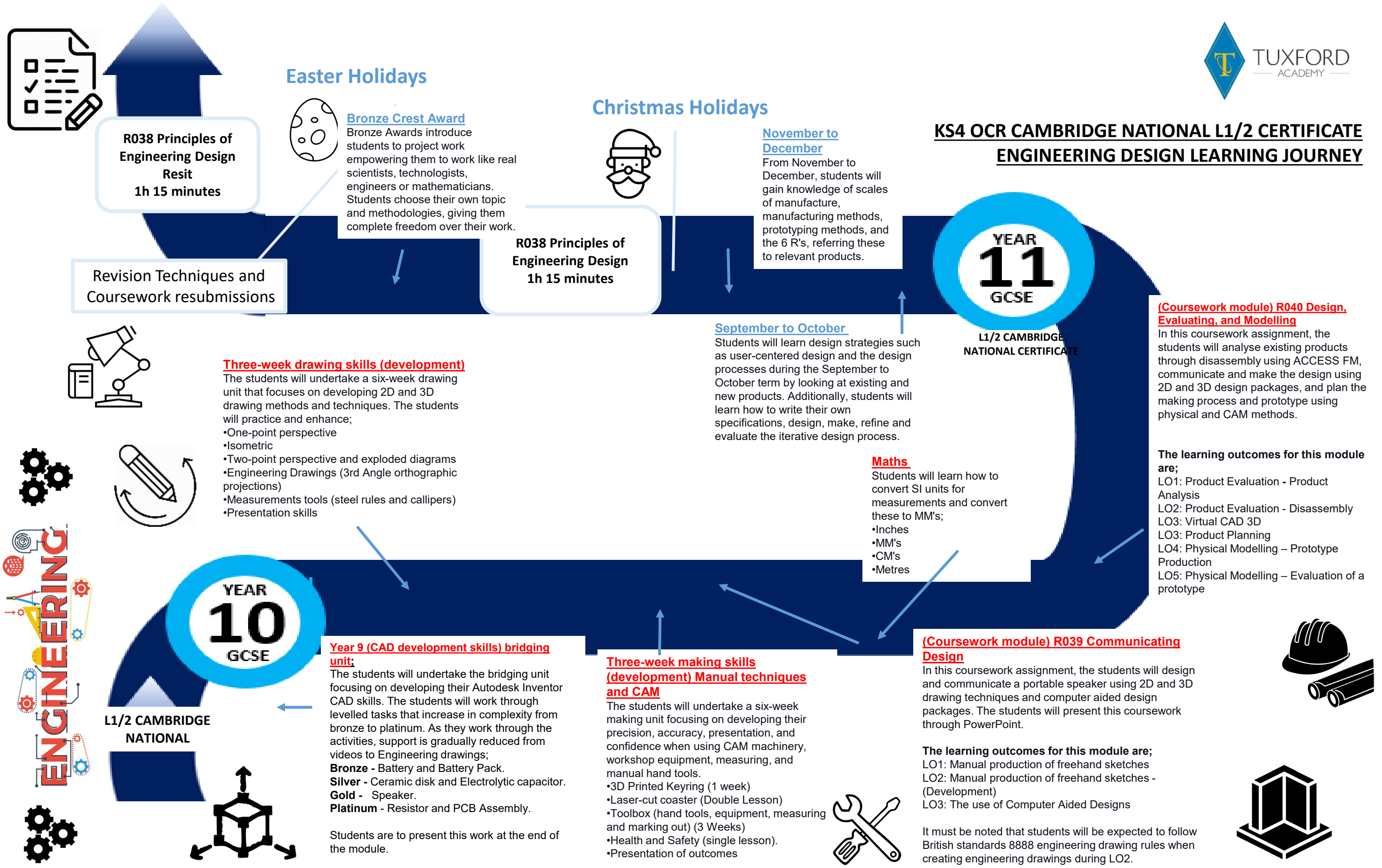


KS4 OCR CAMBRIDGE NATIONAL L1/2 CERTIFICATE ENGINEERING DESIGN LEARNING JOURNEY



Easter Holidays



Bronze Crest Award

Bronze Awards introduce students to project work empowering them to work like real scientists, technologists, engineers or mathematicians. Students choose their own topic and methodologies, giving them complete freedom over their work.

Christmas Holidays



November to December

From November to December, students will gain knowledge of scales of manufacture, manufacturing methods, prototyping methods, and the 6 R's, referring these to relevant products.

September to October

Students will learn design strategies such as user-centered design and the design processes during the September to October term by looking at existing and new products. Additionally, students will learn how to write their own specifications, design, make, refine and evaluate the iterative design process.

Maths

Students will learn how to convert SI units for measurements and convert these to MM's;

- Inches
- MM's
- CM's
- Metres

(Coursework module) R040 Design, Evaluating, and Modelling

In this coursework assignment, the students will analyse existing products through disassembly using ACCESS FM, communicate and make the design using 2D and 3D design packages, and plan the making process and prototype using physical and CAM methods.

The learning outcomes for this module are;

- LO1: Product Evaluation - Product Analysis
- LO2: Product Evaluation - Disassembly
- LO3: Virtual CAD 3D
- LO3: Product Planning
- LO4: Physical Modelling – Prototype Production
- LO5: Physical Modelling – Evaluation of a prototype

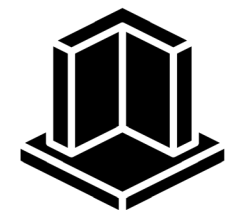
(Coursework module) R039 Communicating Design

In this coursework assignment, the students will design and communicate a portable speaker using 2D and 3D drawing techniques and computer aided design packages. The students will present this coursework through PowerPoint.

The learning outcomes for this module are;

- LO1: Manual production of freehand sketches
- LO2: Manual production of freehand sketches - (Development)
- LO3: The use of Computer Aided Designs

It must be noted that students will be expected to follow British standards 8888 engineering drawing rules when creating engineering drawings during LO2.



YEAR
10
GCSE

L1/2 CAMBRIDGE
NATIONAL

Year 9 (CAD development skills) bridging unit;

The students will undertake the bridging unit focusing on developing their Autodesk Inventor CAD skills. The students will work through levelled tasks that increase in complexity from bronze to platinum. As they work through the activities, support is gradually reduced from videos to Engineering drawings;

- Bronze** - Battery and Battery Pack.
- Silver** - Ceramic disk and Electrolytic capacitor.
- Gold** - Speaker.
- Platinum** - Resistor and PCB Assembly.

Students are to present this work at the end of the module.

Three-week making skills (development) Manual techniques and CAM

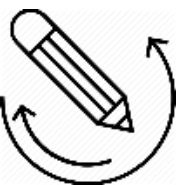
The students will undertake a six-week making unit focusing on developing their precision, accuracy, presentation, and confidence when using CAM machinery, workshop equipment, measuring, and manual hand tools.

- 3D Printed Keyring (1 week)
- Laser-cut coaster (Double Lesson)
- Toolbox (hand tools, equipment, measuring and marking out) (3 Weeks)
- Health and Safety (single lesson).
- Presentation of outcomes

Three-week drawing skills (development)

The students will undertake a six-week drawing unit that focuses on developing 2D and 3D drawing methods and techniques. The students will practice and enhance;

- One-point perspective
- Isometric
- Two-point perspective and exploded diagrams
- Engineering Drawings (3rd Angle orthographic projections)
- Measurements tools (steel rules and callipers)
- Presentation skills



R038 Principles of
Engineering Design
Resit
1h 15 minutes

Revision Techniques and
Coursework resubmissions

R038 Principles of
Engineering Design
1h 15 minutes

Core Expectations



1. Attend every lesson on time.
2. Meet coursework deadlines.
3. Conduct yourself in a professionally manner in classroom.
4. Track the teacher and your peers when speaking.
5. Work as a team and share knowledge and skills.
6. Follow H&S and SRR guidance.
7. Work to the best of your ability.

When will you sit the exam?

Jan 2024

R038 | External Examination



In this section we will cover:

Topic Area 1.1: The stages involved in design strategies

Topic Area 1.2: Stages of the iterative design process, and the activities carried out within each stage of this cyclic approach

Topic Area 2.1: Types of criteria included in an engineering design specification

Topic Area 2.2: How manufacturing considerations effect design

When will you sit the exam?

Jan 2024

R039 | Internal Examination



In this section we will cover:

In this coursework assignment, you will design and communicate a portable speaker using 2D and 3D drawing techniques and computer aided design packages. You will present this coursework through PowerPoint.

The learning outcomes for this module are;

LO1: Manual production of freehand sketches

LO2: Manual production of freehand sketches - (Development)

LO3: The use of Computer Aided Designs (Autodesk Inventor)



What will I produce?

A Portfolio of work

R040 | Internal Examination



In this section we will cover:

In this coursework assignment, the students will analyse existing products through disassembly using ACCESS FM, communicate and make the design using 2D and 3D design packages, and plan the making process and prototype using physical and CAM methods.

The learning outcomes for this module are;

- LO1: Product Evaluation - Product Analysis
- LO2: Product Evaluation - Disassembly
- LO3: Virtual CAD 3D
- LO3: Product Planning
- LO4: Physical Modelling – Prototype Production
- LO5: Physical Modelling – Evaluation of a prototype



What will I produce?

A Portfolio of work

Other opportunities



Bronze Crest Award

Bronze Awards

Bronze Awards introduce students to project work empowering them to work like real scientists, technologists, engineers or mathematicians. Students choose their own topic and methodologies, giving them complete freedom over their work.

[Sign up to run a CREST Bronze Award](#)

TYPICAL AGE

11+

TIME TO COMPLETE

10+ hours

Entry fee per student: Free Wales / £5 rest of UK / £10 international*

*For projects outside the UK, there is a [minimum order size of ten CREST Bronze Awards](#).

The challenge

Students work independently or in groups to plan and run a project addressing a real-world STEM problem.

Available resources

Download inspirational project ideas from the [resource library](#). The [secondary getting started](#) and [teacher guides](#) are full of useful hints and tips to help you run CREST with your students.

The outcome

The project process develops enquiry, problem-solving and communication skills. CREST Bronze can be used by students to enhance their [UCAS personal statements](#). After completing the project, each student receives a [personalised certificate](#).

Where can this course take me?



Apprenticeships

Mechanical Engineer apprentice

Automotive mechanical apprentice

Machinist

Electronics Technician apprentice

Process Engineer apprentice

A-Levels

A-Level Engineering

A-Level Design and Technology

A-Level Business

Where can this course take me?



Degree(s)

MEng (Hons) Motorsport Engineering

BSc (Hons) Civil Engineering

BSc (Hons) Mechanical Engineer

BEng (Hons) Engineering Management

BSc (Hons) Electrical and Electronic Engineering

**BEng (Hons) Manufacturing and Production
Engineer**

BSc (Hons) Mathematics

BSc (Hons) Aerospace Engineering

BSc (Hons) Architectural Design

Jobs

Aerospace Engineer

Motorsport Engineer

Structural Engineer

Electrical Engineer

Mechanical Engineer

What are the benefits of an engineering degree?



Did you know?

Facts

Average starting wage for an Engineer:
£30,557 per annum

Average wage for an Engineer After 5 years:
£47,896 per annum

Senior Engineers can earn up to:
£110,000 per annum

With Senior Engineers wages starting at:
£76,983 per annum

What are the benefits of an engineering degree?



A long term goal

This Course can be stepping stone towards a future career in **Engineering or Design.**

As long as you work hard!!

Today's Aim:



Working towards developing your skills on Autodesk Inventor to be able to use it independently and with precision.

Start to produce a CAD portfolio of work, displaying a range of products and parts.