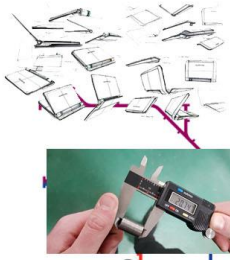


ENGINEERING JOURNEY



YEAR 11: Students will continue to complete unit R038 Principles of engineering design and start to complete unit R040 Design, evaluation and modelling. R038 looks at the theory content for the course that was started during year 10 and will continue into year 11. R040 considers the following areas: Product Evaluation – Product Analysis and Disassembly, Virtual CAD 3D, Physical Modelling – Production Planning, Prototype Production and Evaluation of a prototype. Similarly to the NEA covered in year 10 the exam board will change the unit product context each year.



YEAR 10: Students will start to complete units: R038 Principles of engineering design and R039 Communicating designs. R038 looks at the theory content for the course and will start to be taught during year 10 and will continue into year 11. R039 sees students working through a series of tasks linked to their first NEA unit. It consists of the following areas: Manual production of freehand sketches and development sketches, Manual production of engineering drawings, Use of computer aided design (CAD). The unit focus changes each year by the exam board.

YEAR 7: Introduces students to Design and Technology and the different areas it can encompass. Students will look at more 'traditional' methods of construction so as to understand how to select appropriate tools and processes as well as look at new and emerging technologies and how they can benefit industry. Students will understand the health and safety elements of the subject and how to effectively use the workshops.



FINHAM PARK

Units Covered:

R038: Principles of engineering design

R039: Communicating designs

R040: Design evaluation and modelling

Exam Preparation
Exam technique
Weaker areas of knowledge
Difficult areas of knowledge
Layout and organisation of paper

R038:
Topic Area 1: Designing processes
Topic Area 2: Design requirements
Topic Area 3: Communicating design outcomes
Topic Area 4: Evaluating design ideas

11

10

9

8

7

Environmental Engineering

AQA Realising potential

LAND-ROVER

Energy

ARUP

ASTON MARTIN

A Level and beyond:
Students can continue in the 6th Form in A Level Product Design or be ready to continue their own Engineering Journey in higher education or with an apprenticeship.

Careers in Engineering Industries:
Product Design, Industrial Design, Architecture, Aerospace Engineer, Agricultural Engineer, Automotive Engineer, Bio-medical Engineer, Chemical Engineer, Civil Engineer, Computer Engineer, Drafting and Design Engineer, Electrical Engineer, Environmental Engineer, Geological Engineer, Marine Engineer, Mechanical Engineer and Software Engineer

YEAR 9: Introduction to Engineering sectors and careers: What is engineering? Experiences so far. Health & Safety Students will work on 3 Engineering Design Projects in Year 9 picking up valuable skills needed to help with the GCSE course in Year 10. The students will be honing their skills in sketching, model making, CAD (both 2D and 3D applications). The projects allow students to gain a valuable insight into the design process and different areas of manufacturing, with both more traditional engineering methods and understanding areas of CAM.

YEAR 8: will establish understanding of plastics and plastic processes, metals and metal processes and develop their ability of designing for a user and purpose with two more focussed design briefs. This year students will become more adept at understanding designing techniques and processes to reach outcomes and will also include work on electronics and soldering. Students will also look at graphical design as part of designing their own logos and branding.

ARUP

Design Technology

Finham Park School
ENGINEERING DESIGN

Next Steps

Silicon Spins
Sketchup and 3D printers
Designing for a target market
Domestic and local contexts
Research and exploration
User needs and understanding your target market
Solving own design problems
Designing innovative and appealing products
Presenting and communicating Design Ideas
Annotating sketches
Critique and refine ideas
New and emerging technologies and their uses within industry
Digital Presentations



Sustainable Light
A range of different 3D drawing methods and design presentation including: Isometric Drawing, Orthographic Drawing, Perspective Drawing, Product Analysis
6rs and Sustainability
Vacuum Forming
Production Planning
Soldering and understanding simple circuits
Health and Safety in the workshop and using tools and equipment in the classroom.

Kinnet Box
Natural and manufactured timbers
Specialist tools and equipment
Shaping Timber Wood joints
Fabricate, construct and assemble
Work within tolerances, Health and safety
Surface treatments and finishes for timber
Working from a technical drawing
2D Design and Laser cutter (CAD/CAM)

Speaker
Thermoframing and Thermosetting plastics
Plastic processes
Electrical and electronic systems
Soldering and constructing a circuit
Printed Circuit boards and basic electronic components
Real and relevant design problems
Product comparison
Graphical design
Brand and logo development
Font design and typography
Packaging and uses of
Nets and construction of packaging
Use of jigs and formers

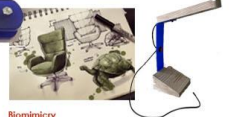


Innovative Architecture
Target Markets and Customer Profiles
Existing Products research
Where do metals come from
Material research into ferrous, non-ferrous metals and alloys
Initial Design ideas
Developed Designs
Final Design/Working drawing
Cardboard model for testing and prototyping purposes.

Skill Building
How automation, robotics and animatronics are used in the real world
Understand the positive and negatives of Robotics and automation
Industry links and careers
How animatronics is used in the film industry
Levers and linkages
Having an understanding of simple circuits
Understanding different inputs, processes and outputs
Programming microcontrollers using Crumble

Year 9 Engineering Design

Multitool
Research to aid the design process
Iterative designing of multitool
Engineering Sketching
Modelling making with mixed materials
Material Requirements Plan (MRP)
Working drawings: BS EN ISO 5457
2D Design of casing and tooling, acrylic laser cutting CAM



Lantern based on 20th Century Design
20th Design movements
Designers
Designing in the style of
Computer input and output devices
The benefits of CAD/CAM in industry
Further knowledge of electrical components and construction
Fault finding and critical evaluating using feedback loops
Use of pre-manufactured components
Wastage
Shaping and forming materials

Biomimicry
Anthropometrics and ergonomics
Innovation and original design
Designers
Product analysis
Designing from a stimulus
3D drawing techniques
Self-assembly and temporary fittings
Presenting design ideas using 3D CAD software
Prototyping and modelling
Producing technical drawings by hand
Producing their own individual outcome

UNIT Coverage: Engineering Design

R038: Principles of engineering design
In this unit you 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. You 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. You 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
In this unit you will learn how to develop your techniques in sketching, and gain industrial skills in engineering drawing using standard conventions that include dimensioning, line types, abbreviations, and representation of mechanical features. You will enhance your confidence and capabilities by using computer aided design (CAD), 2D and 3D software, to produce accurate and detailed drawings and models that visually communicate your designs.

R040: Design, evaluation and modelling
In this unit you will learn how designers can quickly create and test models to develop a prototype of a design. You will develop your virtual modelling skills using computer aided design (CAD) 3D software, to produce a high-quality model that will be able to simulate your design prototype. You will also develop your physical modelling skills using modelling materials or rapid prototyping processes to produce a physical prototype.



A	As Aesthetics	Cost
C	Customer	Environment
E	Environment	Health and Safety
S	Size	Function
S	Safety	Material
F	Function	
M	Material	