

BTEC Tech Award in

Engineering

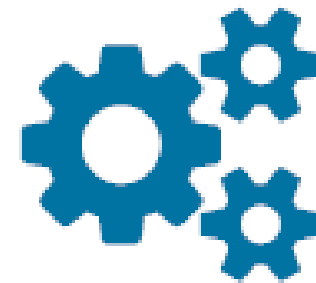
Your Key Stage 4 BTEC for schools



BTEC Tech Awards have been specifically designed:



for 14-16 year olds in schools



to give students a hands-on taste of the sector, and the skills and confidence to take their next steps



Explore

Exploring Engineering Sectors and Design Applications

- Internally assessed assignments
- 30% of the total course



Develop

Investigating an Engineering Product

- Internally assessed assignments
- 30% of the total course



Apply

Responding to a Brief

- Externally assessed task
- 40% of the total course

Explore



Component 1

Exploring Engineering Sectors and Design Applications

Aim: get to know industry sectors and how they work together to solve real-life problems.

Assessment: internally assessed assignments

Weighting: 30% of total course

During Component 1, your students will:

- **explore** the different sectors, products and interconnections within the industry
- **investigate** what various engineering organisations and functions do, in addition to potential career paths
- **discover** the engineering design and manufacture processes.

Develop



Component 2

Investigating an Engineering Product

Aim: explore the types of materials, components and processes used to make products, then reproduce and test a product.

Assessment: internally assessed assignments

Weighting: 30% of total course

During Component 2, your students will:

- learn why engineers choose certain materials and components to make products
- investigate how products are made
- identify best practice when it comes to safety and risk management
- develop research, observation, recording, interpretation and measuring skills
- put what they've learned into practice by safely planning, reproducing and testing an engineered product.

Component 2A

In this unit pupils are asked to independently investigate different materials and processes. They do this by analysing a product (such as a bicycle brake) thoroughly.

All work is to be evidenced in a small portfolio that covers their findings.

Component 2B

In this unit pupils are given a small product to disassemble and rebuild.

They must record and describe all the component parts and keep a small portfolio evidencing their work.

Component 2C

In this unit pupils are asked to independently manufacture a component in the workshop.

They again must keep evidence of all work and create a plan of how to complete the task.

Component 2C: Example Work

IBSE ENGINEERING COMPONENT 2C

PRODUCTION PLANNING

I have produced an initial production plan for the Slider Block. The plan includes all relevant information that should enable an Engineer to manufacture the block along with technical drawings.

I will use the plan to manufacture the block and edit the plan if necessary.

HEALTH & SAFETY

I have been trained to use all the machines, tools and equipment by a trained professional before starting the practical work. I have also completed a risk assessment before I start the task. And ensured I am working in a safe environment. I will edit the risk assessment if I feel a need adjusting during production if required.

PPE consists of the following in my workshop: safety glasses, apron, face mask. If there are any extra required they will be listed separately on the production plan.

INITIAL PRODUCTION PLAN: SLIDER BLOCK

Process	Tools &	Material	Health & Safety	Quality Check	Comments
1. Collect Aluminium	Steel rule	Ø10mm Aluminium SQ Bar	PPE, Risk Assessment	Check Aluminium bar size	Check surface for scratches
2. Measure and mark Aluminium at Ø10mm	Steel rule, scriber, engineer's square, Engineer's blue	Ø10mm Aluminium SQ Bar	PPE, Risk Assessment	Double check measurements	Cut with 1mm margin
3. Cut Aluminium by wasteing, then face off both ends of bar. (Ø10mm x Ø10mm)	hack saw, vice, centre lathe, digital calipers	Ø10mm Aluminium SQ Bar	PPE, Risk Assessment, HEAT!	Final bar length at Ø10mm (use digital calipers)	Final size bar Ø10mm
4. Centre drill and then drill both ends of the Aluminium at Ø10mm. Remove any internal burrs.	Centre lathe, centre drill, Ø10mm drill bit	Ø10mm Aluminium SQ Bar	PPE, Risk Assessment, HEAT!	Visually check holes	Don't drill to the width of the hole
5. Measure and mark vertical and horizontal holes on to Aluminium. Then centre punch.	Engineer's blue, steel rule, scriber, engineer's square, ball point hammer, centre	Ø10mm Aluminium SQ Bar	PPE, Risk Assessment	Double check all markings and centres	Mark in Eng blue ink to make clear. Centre punch both ends of bar.
6. Drill both holes through Aluminium at Ø10mm, and remove burrs.	Vibr drill machine vice, Ø10.5mm drill bit	Ø10mm Aluminium SQ Bar	PPE, Risk Assessment, HEAT!, BURNS!, HEAVY IMPACT!	Visually check holes	Flange with sharp file. Check the H.P.
7. Tap both Ø10mm holes at M4.	Tapping wrench, M4 tap, taper to plug, cutting	Ø10mm Aluminium SQ Bar	PPE, Risk Assessment, CUTTING, COMPOUND	Check reverse thread with a M4 machine screw	Tap from front as possible
8. Remove any burrs and then finish Aluminium surfaces.	Smooth file, wet and dry paper	Ø10mm Aluminium SQ Bar	PPE, Risk Assessment, MACHINE OIL!	Visual and touch check for quality	Not really any burrs to remove

YOUR NAME: *Colin* 24/10/21

IBSE ENGINEERING COMPONENT 2C

We find a photographic record with annotations, that we take photographs throughout the production of the block and to take at least photographs at every stage of manufacture. In photographs show production steps A - D.

Process	Comments	Photographs		
1. Collect Aluminium	Collected and checked for surface blem.			
2. Measure and mark Aluminium at Ø10mm				
3. Cut Aluminium by wasteing, then face off both ends of bar.	Used a scrap of bar to practice the angle and wasteing.			
4. Measure and mark vertical and horizontal holes on to Aluminium. Then centre punch.	Marked blue ink and used a ball point pen to see through the bar.			
5. Drill both holes through Aluminium at Ø10mm.	A bit of extra coolant cutting M4.			
6. Centre drill and then drill both ends of the Aluminium at Ø10mm.	Only drilling into the Ø10mm hole.			
7. Tap both Ø10mm holes at M4.	Cutting completed and M4 tap used.			
8. Remove all burrs and then finish Aluminium surfaces.	A bit of wet and dry cutting completed excess on the end of the bar.			

FINAL PHOTO TO COMPONENT 2C: SHEET 2/24, CLEAN IT UP

Apply



Component 3

Responding to an Engineering Brief

Aim: provide solutions to real-life problems by creating their own engineered product.

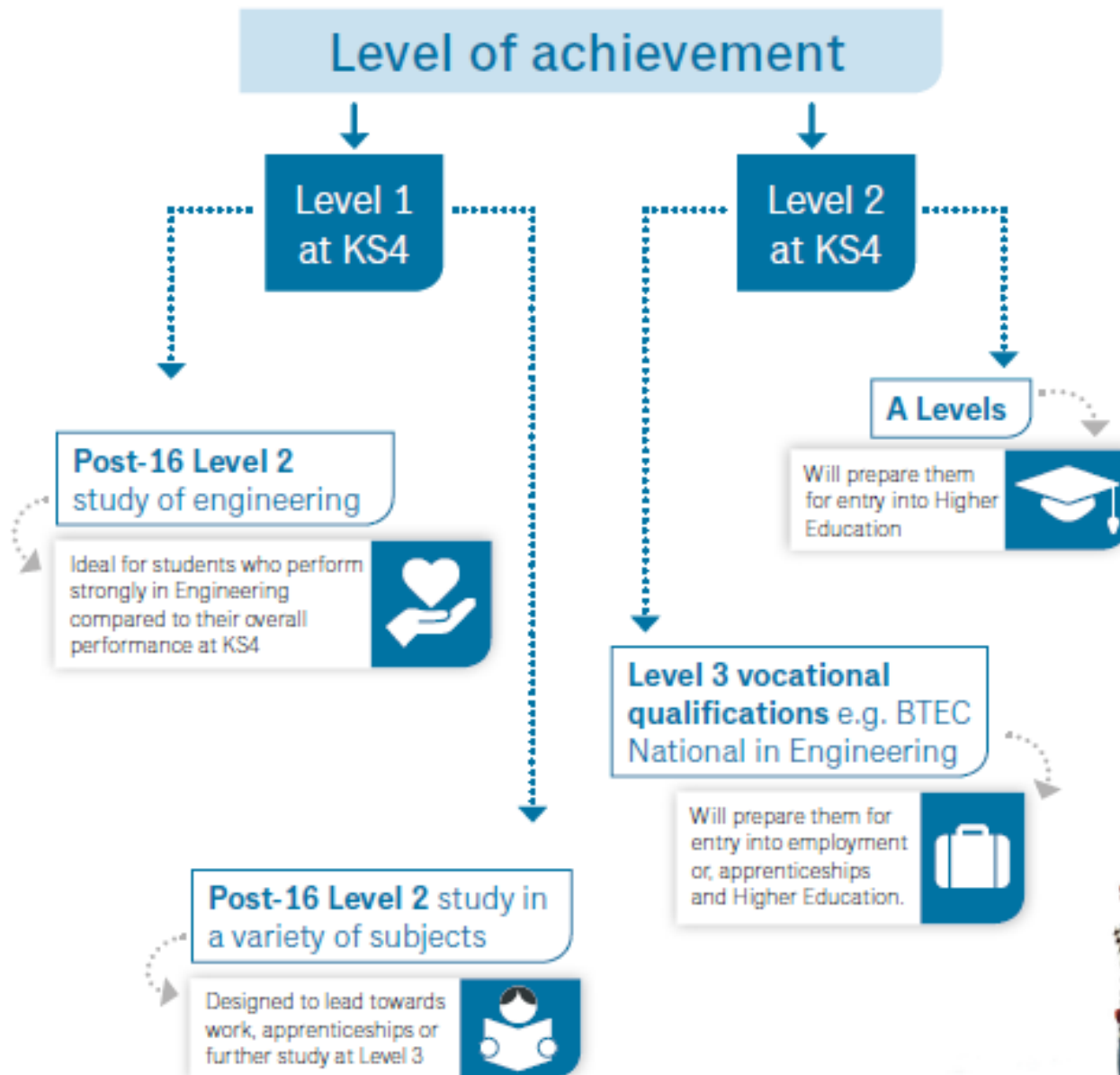
Assessment: externally assessed task, where students create an engineered product based on a brief.

Weighting: 40% of total course

To achieve this aim, your students will:

- build on what they've learned in Components 1 and 2
- identify the problem, develop a hypothesis and investigate possible solutions
- create a prototype that meets the brief
- record, analyse and evaluate data and outcomes, and reflect on how the product meets the brief.

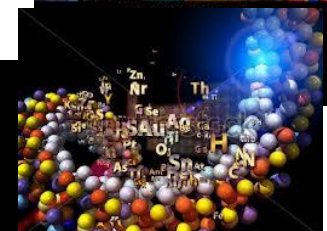
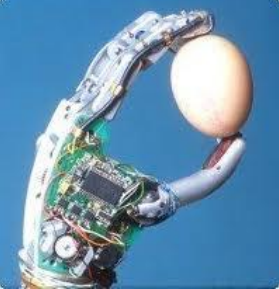
Where can my students progress to?



Career Opportunities

The list really is endless

Electronics
Manufacturing
Welding
Agri-food
Telecommunications
Renewable energy
Space
Low carbon
Automotive
Bioscience
Welding



THANKS

FOR

LISTENING