

Block 1.

The sectors of engineering.

Aerospace industry.

The aerospace industry is a company or individual involved in the various aspects of designing, building, testing, selling and maintain gin aircraft.

Automotive

The automotive instruments is a wide range of organisations involved in the design, development, manufacturing, marketing and selling of motor vehicles.

Communications

The communications industry covers television, radio broadcasting, publishing, advertising, telecommunications and motion pictures.

Electric/electronic

The electronic industry is responsible for making a wide range of products for the consumer electronics sectors.

Mechanical.

The mechanical engineering sector is the discipline that applies physics and materials science principles to design, analyse, manufacture and maintain mechanical systems.

Transport

Transport is the movement of people, animals and good from one location to another using a range of different modes of transport such as air, rail, water, cable and space.

Different engineering companies.

Boeing UK.

An aerospace company based in the Uk that manufactures parts and components to the aerospace company.

Toyota.

A automotive company that manufactures a range of vehicles, parts and components for the automotive industry.

Sky TV plc.

Sky is a communications broadcast company which offer a range of services from TV, internet and communications packages.

Siemans

A electrification, automation and digitalisation company with manufacturing locations over the UK.

Olympus engineering.

A Stoke on Trent based engineering firm that manufacture precision machined components for a range of engineering industry

Transport

Eddie Stobarts is a logistic company that transports items across the UK and Europe based in Stoke on Trent.

Block 2.

Product manufacturing processes.

Casting

Casting is a manufacturing process in which a liquid material is poured into a mould which contains a hollow cavity of the desired shape.

Forging

Forging is a manufacturing process involving the shaping of metals using localised compressive forces.

Shearing

Shearing is a process where material is removed with a cutting process involving an upper and lower blade.

Machining

Machining is a manufacturing term which is defined as the process of removing material from a workpiece using power driven machine tools.

Extrusion

Extrusion is a process used to create objects of a fixed cross sectional profile. The material is used though a dies of the desired cross section.

Injection moulding

Molten materials is injected into a mould under pressure which contains a hollow cavity of the desired shape.

Vacuum forming.

Vacuum forming is where a sheet of plastic is headed and stretched onto a single surface mould via a vacuum.

Engineering jobs roles and interconnectivity.

Aerospace engineer.

Aerospace engineering is the study of the design, development and production of air and spacecraft.

Automotive engineer.

Automotive engineering is the study of the design, development and production of vehicles and vehicle parts.

Communications engineer.

Communications engineering is the study of the design, development and production of products and services for the communication sectors.

Electrical/electronic engineer.

Electrical/electronic engineer is the study of the design, developments and production of products and services for the electrical/electronics engineering sector.

Mechanical engineer.

Mechanical engineering is the study of the design, development and production of products for a wide range of engineering sectors.

Transport engineer.

Transport engineering is the study, design, development and production of products , systems and upkeep of products and application for the transport sector.

Block 3.

The Design process.

Define the problem.

Decide upon a clear idea of what the problem is.

Collect information.

Collect sketches, take photographs and gather data to start giving you inspiration.

Brainstorm and analyse ideas.

Begin to sketch, make, and study so you can understand how all the data and information you have collected may impact on your design.

Develop solutions.

Take your preliminary ideas and form multiple small scale design solutions.

Gather feedback.

Present your ideas to as many people as possible: friends, teachers, professionals and any other you trust to give insightful comments.

Existing product analysis

Existing product analysis is conducted at the academy using ACCESS FM. This stands for the following:-

Aesthetics.

Describe the visual appearance of the product.

Cost.

What is the cost of the product?

Customer.

Explain who would purchase the product.

Environment.

Is the product eco-friendly?

Safety.

Is the product safe to use for its customers?

Size.

What are the maximum and minimum dimensions of the product?

Function.

Explain what the product does to be a successful example of that type of product.

Materials.

What materials have been used to manufacture the product?

Block 4.

Sketching and modelling.

2D sketching.

Look, layout, lines shape, shadow and shine

Overlap, texture & detail, drop shadow.

3D sketching.

1 & 2 point perspective.

Basic forms - cuboids, prisms, cylinders, cones and spheres.

Combining basic forms to create objects.

Peer assessment and review.

Peer assessment is a process where students or their peers grade assignments or tests based on a teacher set benchmark.

Peer feedback is a practice where feedback is given by one student to another.

Computer aided design.

Computer aided design is the use of a computer system to aid in the creation, modification, analysis or optimisation of a design solution.

Computer aided design is one of the many tools used by engineers and designers and is used in many ways depending on the profession of the user and the different type of software in question. CAD is one part of the product development activity within the design process. At the Academy we use 2 different types of CAD. A 2d modelling package for use in combination with the laser cutter and plotter and a 3d modelling package for use in combination with the 3D printers and as a testing platform.

Computer aided manufacture.

Computer aided manufacturing is the use of software to control machine tools and related ones in the manufacturing of workpieces and components. CAM may also refer to the use of a computer to assist in all operations of a manufacturing plant, including planning, management, transportation and storage.

Both blocks will include practical based manufacturing assignments using a range of different tools, equipment and work holding devices. Content regarding safe working practices, quality control and quality assurance procedures will be taught with this content.