



THE STEM TIMES

The Newsletter for all things STEM
at Magna Academy Poole

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FOCUS ON ENGINEERING



Mrs Bleeze | Head of Chemistry & Physics
STEM Co-ordinator

Q: What is Engineering?

Engineering is the application of science and maths to solve problems. Engineers figure out how things work and find practical uses for scientific discoveries.

Scientists and inventors often get the credit for innovations that advance the human condition, but it is engineers who are instrumental in

making those innovations available to the world.

Engineers design, evaluate, develop, test, modify, install, inspect and maintain a wide variety of products and systems.

There are many different types of engineers, so we have explained the differences in the section below.

MECHANICAL ENGINEERING

Involves design, manufacturing, inspection and maintenance of machinery, equipment and components as well as control systems and instruments for monitoring their status and performance. This includes vehicles, construction and farm machinery, industrial installations and a wide variety of tools and devices.

ELECTRICAL ENGINEERING

Involves design, testing, manufacturing, construction, control, monitoring and inspection of electrical and electronic devices, machinery and systems. These systems vary in scale from microscopic circuits to national power generation and transmission systems.

CIVIL ENGINEERING

Involves design, construction, maintenance and inspection of large infrastructure projects such as highways, railroads, bridges, tunnels, dams and airports.

STRUCTURAL ENGINEERING

Involves design, construction and inspection of load-bearing structures such large commercial buildings, bridges and industrial infrastructure.

AEROSPACE ENGINEERING

Involves design, manufacturing and testing of aircraft and spacecraft as well as parts and components such as airframes, power plants, control and guidance systems, electrical and electronic systems, and communication and navigation systems.

NUCLEAR ENGINEERING

Involves design, manufacturing, construction, operation and testing of equipment, systems and processes involving the production, control and detection of nuclear radiation. These systems include particle accelerators and nuclear reactors for electric power plants and ships, radioisotope production and research. Nuclear engineering also includes monitoring and protecting humans from the potentially harmful effects of radiation.

BIOMEDICAL ENGINEERING

Is the practice of designing systems, equipment and devices for use in the practice of medicine. It also involves working closely with medical practitioners, including doctors, nurses, technicians, therapists and researchers, in order to determine, understand and meet their requirements for systems, equipment and devices.

CHEMICAL ENGINEERING

Is the practice of designing equipment, systems and processes for refining raw materials and for mixing, compounding and processing chemicals to make valuable products.

COMPUTER ENGINEERING

Is the practice of designing computer hardware components, computer systems, networks and computer software.

INDUSTRIAL ENGINEERING

Is the practice of designing and optimizing facilities, equipment, systems and processes for manufacturing, material processing, and any number of other work environments.

ENVIRONMENTAL ENGINEERING

Is the practice of preventing, reducing and eliminating sources of pollution that affect air, water and land. It also involves detecting and measuring pollution levels, determining sources of pollution, cleaning up and rehabilitating polluted sites and ensuring compliance with local, state and federal regulations.

MAGNA COURSES IN PREPARATION FOR A CAREER IN ENGINEERING

Here are the courses offered in Key Stage 4. Useful information for our Year 9 students preparing to make their choices.

BTEC Engineering

BTEC Firsts in Engineering can help you take your first steps towards a career in sectors such as manufacturing, automotive, electrical and mechanical engineering. You'll learn about processes, materials, and how engineering contributes to a sustainable future.

BTEC students develop their knowledge and understanding by applying their learning and skills in a work-related context. The teaching team creates a series of assignments, which can be written or activity based. The format of the assignments varies to suit the needs of the subject area. BTEC First assignments offer students the opportunity to demonstrate their learning in a real-life context.

CAREERS IN ENGINEERING

While the majority of degrees focus on a particular discipline, there are some general engineering courses that enable the decision about which specialism to study to be taken at a later date.

Most universities offer four year undergraduate or integrated masters degrees (MEng) in engineering. This allows for extended study and enables students to acquire Chartered Engineer status more quickly from one of the engineering professional bodies. You can study for a degree in engineering. Just [search here](#) for the many university courses in engineering.

GCSE Product Design

This is a two year course and is designed to enable students to develop their creativity when developing ideas, planning, producing products and evaluating them.

During the course students will:

Develop a working knowledge of a range of materials and components appropriate to modelling, prototyping and manufacturing. Materials studied will include paper/card, wood, metal and plastic.

Develop an understanding of the broad perspectives of the designed world. This will include the appreciation of line, shape, form, proportion, colour, movement and texture within a critical awareness of aesthetics and ergonomics.

Develop an awareness of and be able to use appropriate manufacturing processes and techniques.

GIRLS IN ENGINEERING

At Magna, we are fortunate to be able to run a GCSE Engineering course. We have some brilliant Year 11 students who chose this as an option subject and here is what two of them, Eve and Lily, have to say about it:

"Engineering is very different from all of the other academic subjects because it focuses on the practical elements and writing reports surrounding your designs. It opens your eyes up to the world and lets you experience what it would be like to work in a more practical employment sector. Also it gives you insight into how ordinary things, like a speaker, are manufactured."



"GCSE Engineering gives people a chance to combine assessment through exams with coursework which relieves some of the pressure of examinations."

"We really enjoy this subject because it is a great opportunity to be creative and imaginative through your designs. It also incorporates computer skills, hands on work and learning how things operate. We are currently learning about how the rollercoaster "The Swarm" from Thorpe Park operates and how it was built, which is very interesting."

DIFFERENT ROUTES AND PATHWAYS IN ENGINEERING

If students do not wish to go to university, students can study for an engineering apprenticeship. Generally, engineering apprentices take on an operator role, involving anything from installing telecommunications systems, assembling car engines, fitting and testing machinery, to demolishing buildings or checking commercial or RAF aircraft. However, all programmes involve combining full-time employment with part-time study. You could be allocated one day a week to attend college or university, or study in scheduled blocks of a week or more. Assessment methods depend on the apprenticeship, but it's likely that you'll be assessed through a combination of essays, coursework and practical and written exams.

Find out about local apprenticeships:

[Engineering Apprenticeships at Bournemouth and Poole College](#)

[Local apprenticeship job role vacancies](#)

If you are interested in a career in engineering, it is always a good idea to get some work experience to find out more about the job and whether you will enjoy it. Keep up to date with all online work experience opportunities here at [Futures Online](#).