Title of course: Engineering Science

Award Received

Successful completion of the course would result in an award of A-D at National 5 level or a Pass/ Fail at National 4.

Entry Level: What do I need to do it?

There is a considerable amount of mathematical equations and problem solving required in this subject therefore pupils should either have passed or be attempting Maths or Physics at National 5 level.

Course Content: What will I learn?

The National 5 Engineering Science course provides a broad introduction to a variety of Engineering disciplines. The areas covered are Electronics, Computer Control, Systems and Energy, Pnuematics and Mechanisms & Structures. Each of these areas are explored in detail through short assignments followed up by observations and calculations. A combination of this course together with a science and a Maths provides a very strong foundation for further study in engineering, the sciences or related careers.

Course Structure – National 5 Engineering Science has three areas of study

- **Engineering Contexts and Designs**

Pupils develop an understanding of engineering concepts by exploring a range of engineered objects, engineering problems and solutions. This allows them to explore some existing and emerging technologies and challenges to consider the implications relating to the environment, sustainable development and economic and social issues.

- **Electronics and Control**

Pupils explore a range of key concepts and devices used in electronic control systems, including analogue, digital and programmable systems. They develop skills in problem solving and evaluating through simulation, practical projects and investigate tasks in a range of contexts.

- **Mechanisms and Structures**

Pupils develop an understanding of mechanisms and structures. They develop skills in problem solving and evaluating through simulation, practical projects and investigate tasks in a range of contexts.

Teaching Methods: What will I do?

The bulk of the course is delivered through a series of units, each one exploring a new Engineering concept and technique. This is not a practical course as such but pupils will

build electronic and pneumatic circuits which will be tested and readings taken. The mechanisms and structures element is taught through computer simulation.

Pupils will mainly be working individually, although at times it may be appropriate to work in pairs, particularly when constructing electronic and pneumatic circuits.

When working through the units, pupils will use formulae to calculate, voltage, current, resistance, forces, pressure, speeds, gear ratios etc. Time is spent analysing engineering systems and extended written answers are required throughout the course.

Assessment: How will I be assessed?

There are two components that will determine the overall course assessment; a question paper and a course assignment.

Component One – Question Paper (this is worth 70% of the overall mark)

The external question paper is worth 110 marks. The purpose of the question paper is to assess the application of skills, knowledge and understanding from across the course. The question paper is 1 hour in duration.

Component Two – Course Assignment(this is worth 30% of the overall mark)

The practical activity assesses pupils ability to apply engineering science skills and knowledge developed and acquired during the course. This is done in the context of defined tasks that require candidates to respond to a problem or situation.

The assignmentcovers a problem solving process and is split into five areas. These areas are:

- Analysis
- Designing a Solution
- Building the Solution
- Testing
- Evaluation

Homework.

There will be regular homework and end of unit tests. Homework is often exam type questions that will help prepare pupils for the final exam. Homework will also, hopefully, provide further understanding of the key concepts taught in class.

Progression in the Senior Phase.

Higher Engineering will be offered in session 2021/ 22 and beyond. The Higher is recognised by Universities and is particularly desirable for those wishing to follow a career in one of the Engineering disciplines covered.