

### Spring (Coursework)

- Material Science: Awareness of materials science is needed by design engineers and all other types of engineers in order that they can make informed decisions about the engineering materials that they choose to use in design and manufacture.
- This curriculum complements the same Materials Science curriculum delivered by Teacher 1, focusing on:
  - Know the applications and benefits of modern and smart materials
  - Be able to test the suitability of materials for different applications
  - Understand properties, standard forms and failure modes of materials

### Summer

- Science for engineering: Different branches of science underpin the teaching and learning of a number of engineering disciplines. In this unit we focus on the science which supports mechanical engineering, electrical and electronic engineering, fluid dynamics, thermal physics and material science for engineering. This unit will develop the learner's knowledge and understanding of principles of engineering science and consider how these can be applied to a range of engineering situations:
- By completing this unit learners will:
  - understand properties of materials
  - know the basic principles of thermal physics

### Examinations

#### Unit 1: Mathematics for Engineering

- 60 Marks
- 90 Minutes

#### Unit 2: Science for Engineering

- 60 Marks
- 90 Minutes

#### Unit 3: Principles of Mechanical Engineering

- 60 Marks
- 90 Minutes

#### Unit 4: Principles of Electrical and Electronic Engineering

- 60 Marks
- 90 Minutes

### Autumn

- Mathematical Methods for engineering: Mathematics is one of the fundamental tools of the engineer. It underpins every branch of engineering and the calculations involved are needed to apply almost every engineering skill. This unit will develop learners' knowledge and understanding of the mathematical techniques commonly used to solve a range of engineering problems:
  - exponentials and logarithms related to engineering problems
  - the use of trigonometry in the context of engineering problems
  - calculus relevant to engineering problems
  - how statistics and probability are applied in the context of engineering problems

### Spring (Coursework)

- Material Science: Awareness of materials science is needed by design engineers and all other types of engineers in order that they can make informed decisions about the engineering materials that they choose to use in design and manufacture.
- The aim of this unit is for learners to understand material structure and classification, and common properties, standard forms and failure modes of engineering materials.
- They will develop an understanding of industrial material processing techniques, and how this is affected by materials' properties.
- They will gain knowledge on the application and uses of modern and smart materials, and develop the ability to be able to test the suitability of different engineering materials for their intended application.

### Summer

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- By completing this unit learners will:
  - understand applications of SI units and measurement
  - understand fundamental scientific principles of mechanical engineering
  - understand fundamental scientific principles of electrical and electronic engineering
  - know the basic principles of fluid mechanics

## Year 13 Teacher 1

### Autumn

- Principles of Mechanical Engineering: All machines and structures are constructed using the principles of mechanical engineering. Machines are made up of components and mechanisms working in combination. Engineers need to understand the principles that govern the behaviour of these components and mechanisms. This unit explores these principles and how they are applied.
- By completing this unit learners will develop an understanding of:
  - the fundamental geometric properties relevant to mechanical engineering
  - levers, pulleys and gearing
  - the properties of beams
  - the principles of dynamic systems

## Year 13 Teacher 2

### Spring (Coursework)

- Engineering and the Environment: Environmental issues and sustainability are crucial in modern engineering. From legislative, regulatory and ethical perspectives, minimising the impact of engineering on the environment is a high priority.
- The aim of this unit is for learners to develop their understanding of how engineering impacts on the environment.
- This curriculum complements the same Engineering and the Environment curriculum delivered by Teacher 1, focusing on:
  - Know how to evaluate UK performance against global, national and local environmental targets related to engineering
  - Know how innovation is making a difference to the way engineering interacts with the environment

### Summer

- Electrical Engineering: Electrical systems and electronic devices are present in almost every aspect of modern life – and it is electrical and electronic engineers who design, test and produce these systems and devices. This unit will develop learners' knowledge and understanding of the fundamental principles that underpin electrical and electronic engineering

### Spring (Coursework)

- Engineering and the Environment: Environmental issues and sustainability are crucial in modern engineering. From legislative, regulatory and ethical perspectives, minimising the impact of engineering on the environment is a high priority.
- The aim of this unit is for learners to develop their understanding of how engineering impacts on the environment.
- By the end of the unit learners should be able to evaluate how environmental concerns both constrain and drive engineering activities, and how engineering has developed to keep up with these demands against the backdrop of globalisation and global manufacturing.

### Autumn

- Principles of Mechanical Engineering: All machines and structures are constructed using the principles of mechanical engineering. Machines are made up of components and mechanisms working in combination. Engineers need to understand the principles that govern the behaviour of these components and mechanisms. This unit explores these principles and how they are applied.
- By completing this unit learners will develop an understanding of:
  - systems of forces and types of loading on mechanical components
  - the properties of beams
  - the principles of dynamic systems

### Summer

- Electrical Engineering: Electrical systems and electronic devices are present in almost every aspect of modern life – and it is electrical and electronic engineers who design, test and produce these systems and devices. This unit will develop learners' knowledge and understanding of the fundamental principles that underpin electrical and electronic engineering