Engineering Curriculum Overview

This overview document details what students will be studying in this subject area over the course of their time with us and the skills and knowledge they will be covering. Students will be formally assessed across the year and their progress and ATL (Attitude to Learning) will be reported home at the end of each term. Assessments will aim to assess the knowledge and skills a student has covered up to that point in their education, including the curriculum covered in the previous year/s.

Course title: **Level 1/2 Engineering (Manufacture)**

Exam Board: **Cambridge OCR**

Course assessed by:

RO14: Engineering Principles - written examination Cambridge OCR set and marked (Yr11) 1 hour 15 mins 70 marks

RO15: Manufacture a one-off product - centre assessed task Cambridge OCR set and moderated (Yr10) 10-12 hours 60 marks

RO16: Manufacture in quantity - centre assessed task Cambridge OCR set and moderated (Yr10) 10-12 hours 60 marks

Aim of the course:

The course is aimed at students with an interest in Engineering and focuses specifically on the 'manufacture' of products working with hand tools, machines and computer controlled machines. The course does not include any design element as both coursework tasks are created by the exam board. Students are expected to work from an engineering drawing to manufacture the required individual components and assemble them to form a product. Students will be assessed on their ability to apply their knowledge and skills in the manufacture process.

<table>
<tr><th>Half term</th><th>02.09.25 - 23.10.25</th><th>03.11.25 - 19.12.25</th><th>05.01.26 - 13.02.26</th><th>23.02.26 - 26.03.26</th><th>13.04.26 - 22.05.26</th><th>01.06.26 - 17.07.26</th></tr>
<tr><th></th><th>Autumn 1 - 8 weeks</th><th>Autumn 2 - 7 weeks</th><th>Spring 1 - 6 weeks</th><th>Spring 2 - 5 weeks</th><th>Summer 1 - 5 weeks</th><th>Summer 2 - 7 weeks</th></tr>
<tr><td>Year 10</td>
<td colspan="2">RO14 Engineering Principles
Students will start by deepening their awareness of health & safety, identifying hazards, the need for and application of risk assessments before entering the workshop environment.
Students will develop an understanding of engineering drawings so that they can read and follow them when making products.
In the workshop students will develop skills in measuring and marking out, working with a range of hand tools to manufacture a bottle opener keyring and a coat hook producing an annotated photographic record of their manufacture.
RO14 Engineering Principles
Students will continue to develop their knowledge of engineering drawings to understand a wider range of technical features in conjunction with practical activities.
Students will learn how to use a range of machines to manufacture a sliding bevel tool. This will include a power hacksaw, centre lathe, vertical miller and buffer as the key machines.
In the workshop they will further their marking out/measuring skills using more advanced equipment and use hand tools for threading etc.
They will manufacture a sliding bevel tool developing their use of machines, producing an annotated photographic record of their manufacture.</td>
<td>RO14 Engineering Principles
Students will continue to develop knowledge of engineering drawings to understand a wider range of technical features in conjunction with practical activities.
Students will learn about material properties and understand metals and their alloys.</td>
<td>RO14 Engineering Principles
Students will be applying their knowledge as part of the RO15 coursework.</td>
<td>RO14 Engineering Principles
Students will develop more detailed technical knowledge of materials which will include a range of polymers, ceramics, composites and smart materials
Workshop practicals with FPT's (Focussed Practical Tasks) covering:
Forming Processes such as strip heating, vacuum forming and forging etc.</td>
<td>RO14 Engineering Principles
Students will develop technical drawing skills using CAD software.
They will be able to explain and write basic CNC programs before using CAM to manufacture a mobile phone holder.
Students will sit an end of year mock exam to test their knowledge and understanding.</td></tr>
<tr><td></td><td colspan="3">RO15 Manufacture a one-off product
(coursework 60 marks 10 - 12 hours)
Students will be introduced to the RO15 coursework module. The exam board will provide an engineering drawing of components students must manufacture.
They will begin by writing a plan of how they intend to manufacture the components.
Carry out a risk assessment before manufacturing the components.
Time will be dedicated to both practical and recording. They will create an annotated photographic record of the measuring and marking out, use of hand tools and use of machines as they proceed with the manufacture.</td>
<td></td>
<td>RO14 Engineering Principles End of Year exam
Students will sit a mock exam to test their knowledge and understanding</td></tr>
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	Autumn 1 - 8 weeks	Autumn 2 - 7 weeks	Spring 1 - 6 weeks	Spring 2 - 5 weeks	Summer 1 - 5 weeks	Summer 2 - 7 weeks
Year 11	***RO14 Engineering Principles*** Students will develop a deeper understanding of Quality Control and its application throughout manufacturing stages to include the use of templates, jigs, go-no go gauges Knowledge and skills in CAD/CAM/CNC will develop further to include Standard Operating Procedures and Additive processes (3D printing)	***RO14 Engineering Principles*** Students will develop their understanding of different materials including polymers, ceramics and smart materials being able to explain their properties and uses. Workshop practicals with FPT's (Focussed Practical Tasks) covering: Shaping Processes such as sand casting, injection moulding and powder metallurgy, welding and brazing etc.	***RO14 Engineering Principles*** Students will develop an understanding of the Scale of manufacture in the real World, covering areas such as volume of production and levels of automation.	***RO14 Engineering Principles*** Students will further their understanding of engineering in the real World, covering Developments in engineering manufacture. Areas such as Globalistaion, Lean manufacturing, Material requirements planning and the 7 categories of waste	***RO14 Engineering Principles*** Students will be revising for their final examination. Some Focussed practical tasks will be included to revisit and embed the application of theory into action.	***RO14 Engineering Principles*** Students will be revising for and then sit their final examination that will test their knowledge and understanding of engineering manufacture.
	RO16 Manufacture in quantity ***(coursework 60 marks 10 - 12 hours)*** Students will be introduced to the RO16 coursework module. The exam board will provide an engineering drawing of components students must manufacture. Students will begin by writing a plan of how they intend to manufacture the components. They will then manufacture a template to check the quality of the final manufactured parts against. They will write a Standard Operating Procedure for the use of a CAM machine and then use the machine to complete a simulation of the manufacture before manufacturing 2 or more of the components.		***RO14 Engineering Principles Mock exam*** Students will sit a mock exam to test their knowledge and understanding			***RO14 Engineering Principles*** **(examination 70 marks 1 ¼ hours)** **Students sit their final examination. Section A will be 10 questions that are multiple choice. Section B includes, short, medium and a long answer question.**