

Engineering

New course Layout

Mandatory Unit titles	Assessment type	GLH	Extended Certificate (360 GLH)	Foundation Diploma (540 GLH)
			Applied General	Applied General
1. Engineering Principles	Written exam	120	M*	M*
2. Delivery of Engineering Processes Safely as a Team	Assignment	60	M*	M*
3. Engineering Product Design and Manufacture	Task	120	M*	M*
4. Applied Commercial and Quality Principles in Engineering	Assignment	60		M*

Assignment – Set and marked internally
 Task – Set and marked by Pearson
 Written exam – Set and marked by Pearson

M – Mandatory unit
 * – Students must pass this unit



As can be seen in the table there will be 3 mandatory units for the Extended certificate and 4 for the Foundation Diploma, all of which must be passed to achieve that level.

Assignments (in green) are selected scenarios or questions that will require you to apply your knowledge to in various ways including

- Creating and presenting PowerPoints on different topics while being observed by teachers or fellow pupils.

Tasks (In purple) are external set exams on a pre-released part or system that asks you to re-design a part or whole or the product referencing, materials choice, embodied energy, processes involved, potential sizes etc.

Written Exams- A written test that revolves around engineering principles. Mainly Maths problems and theorems.

What is new

The written exam

- The written exam will consist of a number of different areas of engineering maths such as;
- Section A: Applied Mathematics
- Section B: Mechanical and Electrical, Electronic Principles
- Section C: Synoptic Question

Tasks

- Tasks are different from assignments in that they are set by the exam board and are given specific deadlines for completion under a set of rules similar to an exam. They are based on work place scenarios
- Section A will be released before hand containing some information
- Time before Section B is released to research areas and topics that may be relevant as well as prepare Research notes maximum (maximum two A4 sides that can be brought into Section B)
- When section B is released it will take place during a two week slot decided by the exam board over 8 hours the number and duration of sessions to be decided by the centre. But once the session has begun it must be completed within 5 consecutive days.
- While Section B is underway all research notes are kept secure and supervised during the sessions and collected in at the end and redistributed at the next session.

Useful skills

- While there are levels that are required for the entry to this course the mind-set that you enter this course with will greatly effect the outcome of the course.
- You will be expected to be pro-active in your pursuit of knowledge, informing your teacher about topics you are unsure of, researching new concepts on your own time, practicing questions or seeking additional questions or help

What we will cover

Extended Certificate 360 GLH	
TOTAL: 4 UNITS	
3 MANDATORY UNITS	
1. Engineering Principles (120 GLH)	
2. Delivery of Engineering Process Safely as a Team (60 GLH)	
3. Engineering Product Design and Manufacture (120 GLH)	
1 OPTIONAL UNITS	
Optional Unit (60 GLH)	

Foundation Diploma 540 GLH	
TOTAL: 7 UNITS	
4 MANDATORY UNITS	
1. Engineering Principles (120 GLH)	
2. Delivery of Engineering Process Safely as a Team (60 GLH)	
3. Engineering Product Design and Manufacture (120 GLH)	
4. Applied Commercial and Quality Principles in Engineering (60 GLH)	
3 OPTIONAL UNITS	
Optional Unit (60 GLH)	
Optional Unit (60 GLH)	
Optional Unit (60 GLH)	

Diploma 720 GLH	
Engineering	
Electrical/Electronic	
Mechanical	
TOTAL: 10 UNITS	
5 MANDATORY UNITS	
1. Engineering Principles (120 GLH)	
2. Delivery of Engineering Process Safely as a Team (60 GLH)	
3. Engineering Product Design and Manufacture (120 GLH)	
4. Applied Commercial and Quality Principles in Engineering (60 GLH)	
5. A Specialist Engineering Project (60 GLH)	
5 OPTIONAL UNITS	
Optional Unit (60 GLH)	

Year 1

Extended Certificate

Year 2

Foundation Diploma

Types of assessment

- Assignment – Set and marked internally
- Task – Set and marked by Pearson
- Written Exam – Set and marked by Pearson

Expectations of students

Students on this course will need to be able to work in both team situations as well as being able to successfully work independently. Students will be given controlled opportunities to develop their own knowledge and skill base on various machines, equipment and theorems it is critical the pupils are always trying to surpass themselves. Attendance is a key element as this is a fast moving course and covering a wide range of theory and practical tasks.

Analysis the following product and design brief



The cables on bridges have to put up with tremendous stress and strain over the course of their life span, analysis the forces that will be acting on these kinds of cables and suggest the following:

Explain the following:

- Stress
- Strain
- Young's Modulus of elasticity
- Why are these important considerations for engineers when working on bridges.



Using sketches and annotations suggest the following.

- Possible materials to be used. State Why?
- Possible methods to secure the cables to the bridge and the materials & joining methods used to do so
- Different versions of designs for cable bridges with their benefits and drawbacks

Example task work

In the following slides you will be presented with the information you will be given as part of a task for this course which you would be given a limited time to research and prepare notes for.

You are expected to research the given topic under the suggested headings ready for the beginning of next year where you will be presented with section B

Section A

Read the set task information carefully. This contains Part A, which is the information you need to prepare for the set task. You will need to carry out your own research over the next weeks and you can take up to **two A4 sides** of individually prepared research notes into Part B of the set task. You will then be given the set task to complete under supervised conditions. For Part A, you must work independently and must not share your work with other learners.

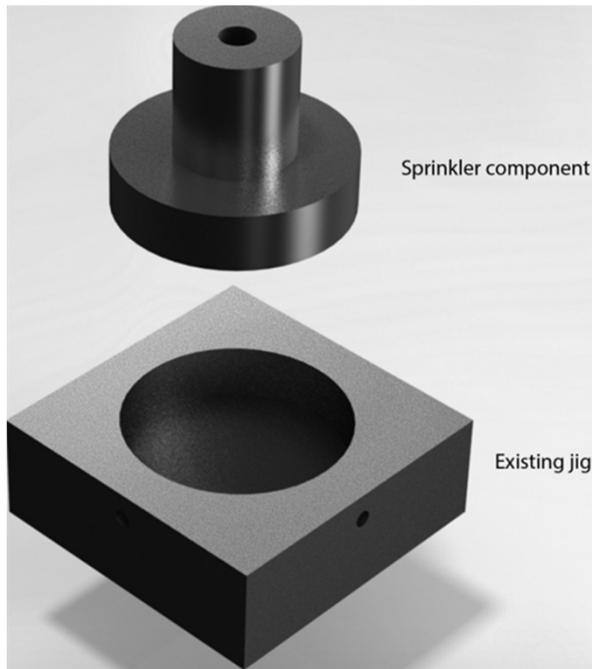
Section A- Set Task Brief

- The product is a jig.
- A machine shop supervisor has asked you, as a junior tooling designer, to redesign a jig that is not working effectively.
- You should research the design and manufacturing requirements that are relevant to jigs and their application.
- Your research may consider:
 - existing designs for jigs
 - the manufacturing processes and technologies that are being used and possible alternatives
 - the health and safety requirements for the manufacturing processes and technologies
 - environmental considerations including sustainability
 - material requirements and suitable material properties
 - any other relevant factors, such as ease of use.

In Part B you will be given further information on the specific issues with the existing jig that will allow you to redesign the jig and evaluate your solution against the issues. You will be able to take up to two sides of individually prepared A4 research notes from Part A into Part B of the set task.

Part A Set Task Information

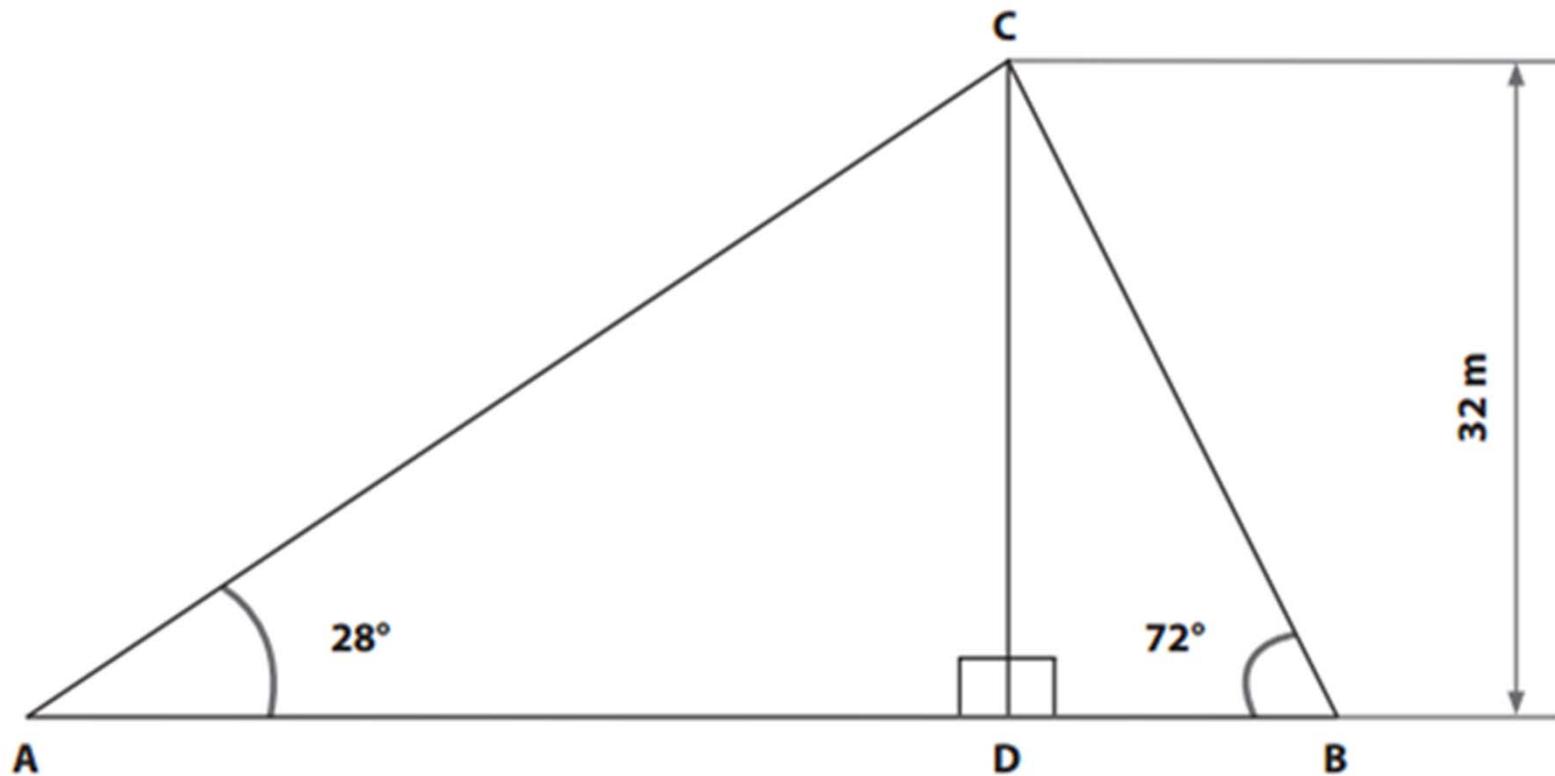
The product is a jig. The jig holds a sprinkler component when it is drilled. Operators place the sprinkler component into the jig to drill two $\text{Æ}3\text{mm}$ holes using a bench drill. The jig itself is held in a machine vice that is clamped to the bench drill table. Currently, the jig is made from low carbon steel and there are six jigs in use at any one time, with a number of spare jigs available. The sprinkler components are made from aluminium alloy, manufactured in batches of 1000, and are used in washing machines and dishwashers.



Exam Paper

The exam paper will involve different maths papers that you will have to answer the following will be examples that you should answer over the summer in preparation of the start of next year.

Use Trigonometry to find the length of the Line from A to B



Calculate the volume and surface area of the object shown below

The diagram shows an example of a plumb bob that is manufactured as a casting by an engineering organisation.

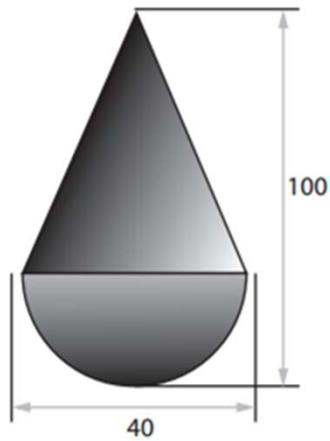


Diagram 1.1

Research S.U.V.A.T

Each letter in the word SUVAT stands for a specific term relating to engineering principles. Find the word behind each letter and have a clear understanding of what it relates to:

S =

U =

V =

A =

T =

What is Archimedes' Principle and how can it be used to determine the density of materials?

What is the difference between a vector and a scalar

Define Stress, Strain and Youngs Modulus