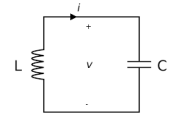


Level 2 Engineering



Level 2 Engineering at Highbury College includes a diverse mix of units. After completing the 3 core units at our Cosham campus, Health and Safety, Engineering Techniques and Engineering Principles, you will get the chance to study 3 subject specific units. These include welding technology, mechanical maintenance and Computer Aided Drawing (CAD). The 3 subject specific units are designed to give you practical experience relevant to the engineering industry and are taught between our engineering workshop at our North Harbour Campus and at our Cosham Campus.

What does the course include?

The level 2 engineering course has been developed to give you an introduction to engineering whilst you primarily study Maths and English. This course is geared at progressing students onto either a level 3 engineering course or a level 3 engineering apprenticeship after successful completion of Maths and English.



Where can this course lead?

Can't wait to get started? Here are some places to get you on your way;

- Check out this Youtube Video - <https://www.youtube.com/watch?v=btGYcizV0il>
- This book is a great read – Technology of Engineering Materials by William Bolton & Mathew Philp
- This website is interesting! - <http://www.secretlifeofmachines.com/>

Have a go!

Below are a couple of activities to get you thinking like an engineer!

Activity 1 – Factors for Design

Design Brief

You are working as design engineers for a marine company. You have been approached by a customer requesting that you design him a Speed Boat.

Your task is to competently design a speedboat hull whilst keeping to the customers specifications to mind.



You will need to consider;

- Material Options
- Material Properties
- Customer Uses
- Customer Preferences

Customer uses

- The customer intends to use the boat as a fishing boat and is only considering going out 2 miles to sea.
- The area he likes to fish in can sometimes contain sharks and mines!
- The boat will be kept on land but will be outside uncovered.

Customer preferences

- The customer has a medium budget and cannot afford an expensive boat.
- The customer would like the boat to go fast.
- The customer would like to be able to paint their boat.

Some things to think about!

- Sharks have big teeth!
- Mines are magnetic!

- Stainless steel is expensive!
- Mild steel is heavy, and it rusts!

Activity 2 – Calculating Efficiency

Engineering is all about efficiency and some questions that every engineer should ask of every process are;

- Could this be faster?
- Could this be more cost effective?
- Could this produce more?



Efficiency can be calculated using the following formula;

$$\text{Efficiency} = \frac{\text{Output}}{\text{Input}} \times 100 \%$$

Using this formula, complete the tables below to determine the required/missing quantities relating to a motor operating at a particular level of efficiency, Question 1 has been answered for you:

Answers can be found at the end.

Question	1	2	3	4
Input	120 W	15 W	W	1 kW
Output	96W	12 W	250 W	W
Efficiency	80 %	%	50 %	97 %

Question	5	6	7	8
Input	101 W	MW	27 W	220 W
Output	100 W	1.5 MW	W	215 W

Efficiency	%	75 %	66.666 %	%
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Question	9	10	11	12
Input	W	350 W	2 kW	W
Output	450 W	W	1.8 kW	0.9 W
Efficiency	75 %	70 %	%	40 %

Question	13	14	15	16
Input	1500 W	MW	600 W	20 W
Output	1000 W	3 MW	W	15 W
Efficiency	%	75 %	45 %	%

Question	17	18	19	20
Input	45 W	MW	270 W	220 W
Output	40.05 W	6 MW	W	180.4 W
Efficiency	%	80 %	90 %	%

Efficiency Answers

Question 2: 80%

Question 3: 500W

Question 4: 970W

Question 5: 99%

Question 6: 2MW

Question 7: 19W

Question 8: 97.77%

Question 9: 600W

Question 10: 245W

Question 11: 90%

Question 12: 2.25W

Question 13: 66.66%

Question 14: 4MW

Question 15: 270W

Question 16: 75%

Question 17: 89%

Question 18: 75MW

Question 19: 243W

Question 20: 82%