

The course is split up into 4 different modules;

Unit 1 - Engineering Principles (External Assessment)

Unit 2 - Delivery of Engineering Processes Safely as a Team (Internal Assessment)

Unit 3 - Engineering Product Design & Manufacture (External Assessment)

Unit 44 - Fabrication Manufacturing Processes (Internal Assessment)

Points available for internal units

The table below shows the number of **points** available for internal units. For each internal unit, points are allocated depending on the grade awarded.

	Unit size	
	60 GLH	90 GLH
U	0	0
Pass	6	9
Merit	10	15
Distinction	16	24

Points available for external units

Raw marks from the external units will be awarded **points** based on performance in the assessment. The table below shows the **minimum number of points** available for each grade in the external units.

	Unit size	
	90 GLH	120 GLH
U	0	0
Near Pass	6	8
Pass	9	12
Merit	15	20
Distinction	24	32

Internal Units (coursework) are too be done independently with feedback given once. After the second submission the grade has to be submitted.

External Units (Exams) Unit 1 & 3 first sitting(s) will be in summer. Learners can then choose to resit these exams twice. (There is a cost associated with resits) (In the following Jan & May) with the highest grade sticking.

Certificate		Extended Certificate	
180 GLH		360 GLH	
Grade	Points threshold	Grade	Points threshold
U	0	U	0
Pass	18	P	36
Merit	26	M	52
Distinction	42	D	74
Distinction*	48	D*	90

Unit 1 - Engineering Principles (Externally Assessed)

This unit will develop your mathematical and physical scientific knowledge and understanding to enable you to solve problems set in an engineering context. You will explore and apply the algebraic and trigonometric mathematical methods required to solve engineering problems. The mechanical problems you will encounter cover static, dynamic and fluid systems. The electrical and electronic problems you will encounter cover static and direct current (DC) electricity, DC circuit theory and networks, magnetism, and single-phase alternating current theory

Assessment Objectives

AO1 Recall basic engineering principles and mathematical methods and formulae Marks: ranges from 1 to 5 marks

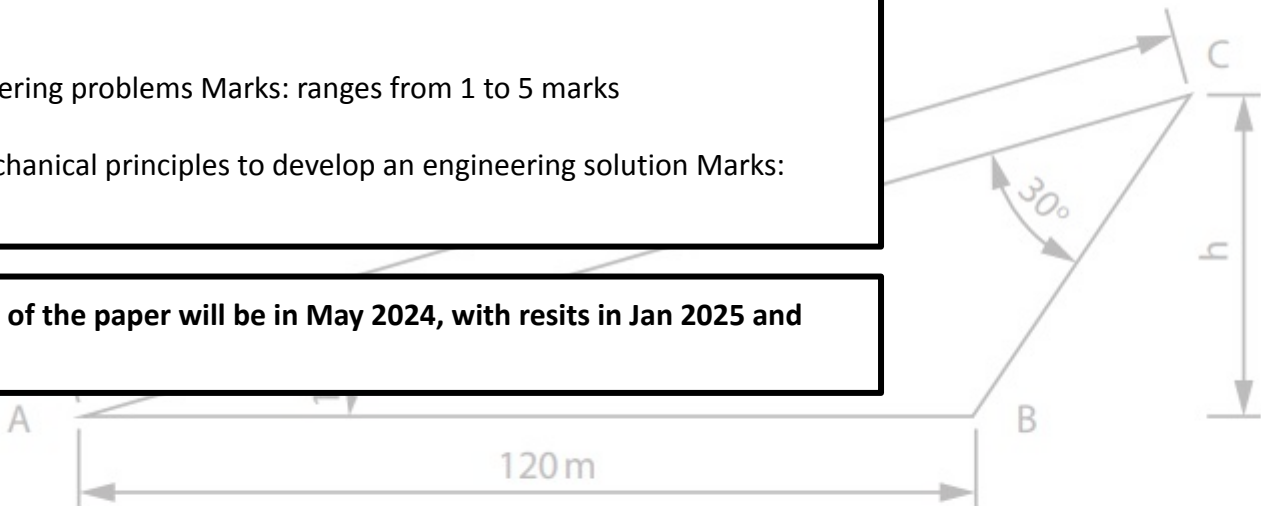
AO2 Perform mathematical procedures to solve engineering problems Marks: ranges from 1 to 10 marks

AO3 Demonstrate an understanding of electrical, electronic and mechanical principles to solve engineering problems Marks: ranges from 1 to 5 marks

AO4 Analyse information and systems to solve engineering problems Marks: ranges from 1 to 5 marks

AO5 Integrate and apply electrical, electronic and mechanical principles to develop an engineering solution Marks: ranges from 1 to 10 marks

This will be taught by Mr Fernandes - The first sitting of the paper will be in May 2024, with resits in Jan 2025 and May 2025



5 (a) Calculate the potential energy of the transformer at point C.

(4)

Unit 2 - Delivery of Engineering Processes Safely as a Team

In this unit, you will examine common engineering processes, including health and safety legislation, regulations that apply to these processes and how individual and team performance can be affected by human factors. You will learn the principles of another important process, engineering drawing, and develop two-dimensional (2D) computer-aided drawing skills while producing orthographic projections and circuit diagrams. Finally, you will work as a team member and team leader to apply a range of practical engineering processes to manufacture a batch of an engineered product or to safely deliver a batch of an engineering service.

This will be your first unit, which you will be assessed on between December - March

Pass	Merit	Distinction
Learning aim A: Examine common engineering processes to create products or deliver services safely and effectively as a team		A.D1 Evaluate, using high-quality written language, the effectiveness of using different engineering processes to manufacture a product or to deliver a service and how human factors, as an individual and as a team, affect the performance of engineering processes.
A.P1 Explain how three engineering processes are used safely when manufacturing a given product or when delivering a given service. A.P2 Explain how human factors, as an individual or as a team, affect the performance of engineering processes.	A.M1 Analyse why three engineering processes are used to manufacture a product or to deliver a service and how human factors, as an individual and as a team, affect the performance of engineering processes.	
Learning aim B: Develop two-dimensional computer-aided drawings that can be used in engineering processes		B.D2 Refine, using layers, an accurate orthographic projection of a component containing at least three different common feature types and a circuit diagram containing at least six different component types to an international standard.
B.P3 Create an orthographic projection of a given component containing at least three different feature types. B.P4 Create a diagram of a given electronic circuit containing at least six different component types.	B.M2 Produce, using layers, an accurate orthographic projection of a component containing at least three different feature types and a circuit diagram containing at least six different component types that mostly meet an international standard.	
Learning aim C: Carry out engineering processes safely to manufacture a product or to deliver a service effectively as a team		C.D3 Consistently manage own contributions effectively using feedback from peers, as a team member and as a team leader, to set up, organise and manufacture a product or deliver a service safely, demonstrating forward thinking, adaptability or initiative.
C.P5 Manage own contributions to set up and organise a team in order to manufacture a product or deliver a service. C.P6 Produce, as an individual team member, a risk assessment of at least one engineering process. C.P7 Set up, as an individual team member, at least one process safely by interpreting technical documentation. C.P8 Manage own contributions safely, as a team member and as a team leader, to manufacture a batch of an engineered product or to deliver a batch of an engineering service.	C.M3 Manage own contributions safely and effectively using feedback from peers, as a team member and as a team leader, to manufacture a product or to deliver a service.	

Unit 3 - Engineering Product Design & Manufacture

In this unit, you will examine what triggers changes in the design of engineering products and the typical challenges that engineers face, such as designing out safety risks. You will learn how material properties and manufacturing processes impact on the design of an engineering product. Finally, you will use an iterative process to develop a design for an engineering product by interpreting a brief, producing initial ideas and then communicating and justifying your suggested solution.

Assessment Objectives

- AO1 Demonstrate knowledge and understanding of engineering products and design
- AO2 Apply knowledge and understanding of engineering methodologies, processes, features and procedures to iterative design
- AO3 Analyse data and information and make connections between engineering concepts, processes, features, procedures, materials, standards and regulatory requirements
- AO4 Evaluate engineering product design ideas, manufacturing processes and other design choices
- AO5 Be able to develop and communicate reasoned design solutions with appropriate justification

This is an 8 hour product Re-design exam. Your first sitting will be in May 2024, with resits in Jan 2025 and May 2025

Maximum depth of the solvent

Treatment tank – insulation, heating elements and electrical fittings removed for clarity

Overall dimensions of the removable cover:
Length 1770 mm, Width 1020 mm, Height 20 mm

Metal plate

Handle (300 mm wide)

Removable cover
5 mm stainless steel plate (welded)

Handle (300 mm wide)

Detail of corner
(welded internally)

Unit 44 - Fabrication Manufacturing Processes

In this unit, you will cover the four main stages of manufacturing a sheet metal product: preparation, cutting out blank components, forming up the components and joining them into an assembled product. You will learn the safe use of a range of industrial hand tools, machinery and other equipment associated with fabrication processes.

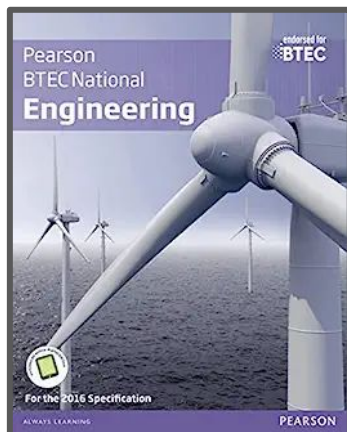
This will be your last unit, which you will be assessed on between December - March in year 13.

Pass	Merit	Distinction
Learning aim A: Examine the processes and technology used in sheet metal fabrication that are widely used in industry		A.D1 Evaluate, using language that is technically correct and of a high standard, the use of contrasting fabrication processes to sustainably manufacture sheet metal components in different batch sizes.
A.P1 Explain how different fabrication processes are used to manufacture sheet metal components.	A.M1 Analyse how different fabrication processes are used to sustainably manufacture sheet metal components to the intended accuracy.	
Learning aim B: Carry out the preparation necessary to manufacture a fabricated product safely		BC.D2 Refine, during the process, the blank design, set-up and parameters of the fabrication equipment to safely, effectively and efficiently manufacture a fabricated product.
B.P2 Explain which health and safety requirements apply when using fabrication processes and conduct a risk assessment of the work environment.	B.M2 Analyse component blanks through modelling and safely and accurately mark components out.	
B.P3 Set up safely at least two cutting, two forming and two joining processes.		
Learning aim C: Carry out fabrication processes to manufacture a fabricated product safely		
C.P4 Manufacture at least four fabricated formed components safely using at least two cutting processes and at least one forming process.	C.M3 Manufacture a fabricated product accurately containing at least four formed components joined using at least two processes.	
C.P5 Manufacture a fabricated product safely containing at least four formed components joined using at least two processes.		
Learning aim D: Review the processes used to manufacture a fabricated product and reflect on personal performance		D.D3 Demonstrate consistently good technical understanding and analysis of fabrication processes, including the application of relevant behaviours and general engineering skills to a professional standard.
D.P6 Review the processes used to manufacture a fabricated product and reflect on personal performance.	D.M4 Recommend improvements to the set up and use of fabrication processes and the relevant behaviours applied.	
D.P7 Explain how relevant behaviours were applied effectively during the manufacturing process.		

Resources;

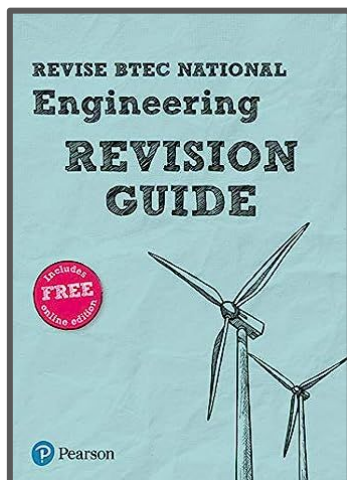
Textbook: BTEC National Engineering Student Book: For the 2016 specifications (BTEC Nationals Engineering 2016) (we have an online version we can give you!)

ISBN: 129214100X



Revision Guide: Pearson REVISE BTEC National Engineering Revision Guide inc online edition

ISBN: 1292150289



Course Specification:

<https://qualifications.pearson.com/content/dam/pdf/BTEC-Nationals/Engineering/2016/specification-and-sample-assessments/spec-btec-nat-eng-extcert.pdf>

Summer work:

Unit 1 Paper - An exam paper with formula book to test how much physics and maths you already know!

Process Passports - Process Descriptions and health and safety of 3 different processes.

**Any further Questions/ queries you can contact me on;
Pfarmer@bestacademies.org.uk**