ENGINEERING - BTEC NATIONAL
EXTENDED CERTIFICATE

Examination Board

- Pearson BTEC

Extended Certificate – 60 Credits (360 Guided Learning Hours)

The Extended Certificate is the equivalent of 1 A Level and is made up of 4 Units which include 2 exams and 2 NEA projects. Two Units are studied in Year 12 and two in Year 13

Students will be assessed through an exam for Unit 1 and Unit 2, a supervised design task for unit 3 and an extended design and Manufacture report for Unit 4. This course has been designed in consultation with industry leaders to ensure the content and tasks are relevant, practical and meet the needs of employers in the Engineering sector.

Year 12 units are as follows:

Unit 1: Engineering Principles (Mandatory 120 GLH External Exam)

Students will develop the skills and knowledge required to solve mechanical, electrical and electronic-based engineering problems by applying appropriate mathematical and physical science principles.

On completion of this unit a student should be able to:

- Recall basic engineering principles and mathematical methods and formulae
- Perform mathematical procedures to solve engineering problems
- Demonstrate an understanding of electrical, electronic and mechanical principles to solve engineering problems
- Analyse information and systems to solve engineering problems
- Integrate and apply electrical, electronic and mechanical principles to develop an engineering solution

Unit 3: Engineering Design (Mandatory 120 GLH Internal NEA/Coursework)

Students will create a design solution in response to an engineering design challenge by developing three-dimensional (3D) models and two-dimensional (2D) detailed drawings including the use of a computer-aided design (CAD) system and other modelling techniques.

On completion of this unit a student should be able to:

- Be able to research and apply knowledge and understanding of engineering products and design
- Apply knowledge and understanding of engineering methodologies, processes, features and procedures to iterative design
- Analyse data and information and make connections between engineering concepts, processes, features, procedures, materials, standards and regulatory requirements
- Evaluate engineering product design ideas, manufacturing processes and other design choices
- Develop and communicate reasoned design solutions with appropriate justification, using CAD and other appropriate techniques to present a final proposal.

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Year 13 units are as follows:

Unit 2: Engineering Applications (Mandatory 60 GLH External Exam)

In this unit students will explore how advances in modern technology are reshaping how a wide range of engineering sectors function. They will also explore how engineers use their understanding of materials and processes to devise sustainable solutions to engineering problems.

On completion of this unit a student should be able to:

- Understand about the activities carried out in a range of engineering sectors and how these are developing in response to current technological advances.
- Be familiar with a range of common engineering materials, their properties and the reasons why they might be selected in preference to alternatives for a given application.
- Understand how the choice of material has a significant impact on the manufacturing process used and how both can influence the design of a component or product.
- Be familiar with a range of manufacturing processes and their applications, including modern processes such as laser cutting and additive manufacturing.

Unit 4: Engineering Project (Mandatory 60 GLH Internal NEA/Coursework)

Students apply project management principles to undertake an individual project and will develop conceptual or practical solutions to a chosen engineering problem related to a relevant engineering specialist area.

On completion of this unit a student should:

- Understand and use project management approaches to solve an engineering problem from a chosen theme or scenario.
- Research engineering problems and use creative skills to generate a range of conceptual or practical solutions to the problem.
- Produce a feasibility study to select the most appropriate solution taking into consideration any given constraints.
- Make use of project management processes, such as planning and monitoring progress, to design and develop a solution that is fit for purpose.
- Use effective communication techniques so that complex technical information can be conveyed.
- Demonstrate communication skills and high standards of behaviour during the development of solutions before showcasing ideas in an accurate technical portfolio.
- Produce Conceptual solutions and/or manufacture prototypes by selecting and using appropriate engineering processes.

Useful websites / reading materials:
https://qualifications.pearson.com/en/qualifications/btec-nationals/engineering-aaq.html

BTEC Level 3 Engineering (AAQ) course textbook:
https://www.pearsonschoolsandfecolleges.co.uk/fe-vocational/subjects/engineering-fe-vocational/btec-national-2025-engineering/ext-cert-student-book-print#products

Recommended study

- 2-4 hours homework / additional study per week. During which time, specific assignment work will be set by staff for students to complete in silent study and free/study periods or at home. Students will be provided with a full assessment calendar with handout and deadlines for all units.