

Purpose Statement

Name of regulated qualification	
QAN: 601/7590/4	Title: Pearson BTEC Level 3 National Extended Diploma in Mechanical Engineering (1080 GLH)

Overview***The engineering sector***

Engineering is a dynamic sector that offers huge potential for students. Engineering turnover was £1.1 trillion in the year ending March 2012, and the sector accounts for 24.5 per cent of the turnover of all enterprises in the UK. The UK is regarded as a world leader in engineering sectors, including renewable energy, space, low carbon, aerospace, creative industries, utilities, automotive, agri-food and bioscience. Between 2010 and 2020 engineering enterprises are projected to have 2.74 million job openings, including more than 400,000 technician roles (as the predominantly ageing workforce in this area is expected to retire in this period).

Mechanical engineering applies the principles of engineering, physics and materials science to design analysis, manufacturing and maintenance of mechanical systems.

New developments in mechanical engineering allow mechanical engineers to develop their skills in the following emerging fields/technologies:

- composites
- mechatronics
- nanotechnology.

Who is this qualification for?

The Pearson BTEC Level 3 National Extended Diploma in Mechanical Engineering is intended as a Tech Level, equivalent in size to 3 A Levels. It will normally be the only qualification in a two-year study programme, but it is also designed to meet the Tech Bacc measure when studied alongside Level 3 mathematics and the Extended Project Qualification (EPQ). Its size means it is particularly for students looking for a full-time course that specialises in the engineering sector, with a strong element of mathematics, and who have firm intentions of progressing to employment in one of the wide variety of roles available.

No prior study of the sector is needed, but students should normally have a range of achievement at Level 2, including mathematics and science, in GCSEs or equivalent qualifications.

What does the qualification cover?

This qualification has been developed in consultation with employers and professional bodies to confirm that the content is appropriate for those interested in working in the sector. In addition, HE has been consulted to ensure that it also supports progression to higher education.

The content meets the knowledge, understanding and skills that underpin the role of senior mechanical engineering technician.

Everyone taking this qualification will study seven mandatory units:

- Engineering Principles
- Delivery of Engineering Processes Safely as a Team
- Engineering Product Design and Manufacture
- Applied Commercial and Quality Principles in Engineering
- A Specialist Engineering Project
- Microcontroller Systems for Engineers
- Calculus to Solve Engineering Problems.

Students choose a further eight optional units to support choices in progression to relevant occupational areas, and to a range of sector-related courses in HE. They cover content areas such as:

- thermodynamics
- fluid mechanics
- metallic and non-metallic materials
- computer-aided design
- pneumatic and hydraulic systems
- electronic devices and circuits
- computer programming
- 3D printing and rapid prototyping
- programmable logic controllers
- CNC machining
- welding.

All students taking this qualification will be required to engage with sector employers as part of their course, for example through industry practitioners contributing to the delivery and assessment of certain units. In addition, the qualification includes an optional work experience unit so all students can benefit from practical experience of the sector.

What could this qualification lead to?

Will the qualification lead to employment, if so, in which job role and at which level?

The Pearson BTEC Level 3 National Extended Diploma in Mechanical Engineering has a primary focus of progression to employment in a related occupational area. This qualification prepares students for roles such as senior mechanical manufacturing technician.

Will the qualification support progression to further learning, if so, what to?

A significant proportion of the job roles in this sector recruit at graduate level, and students may wish to progress to higher education before seeking employment.

In addition to the engineering sector-specific content outlined above, the requirements of the qualification will mean students develop the transferable and higher-order skills that are highly regarded by both HE and employers. For example, when studying the *Applied Commercial and Quality Principles in Engineering* unit, students will develop an understanding of how key business activities and trade considerations affect engineering organisations, and how these can be used to create a competitive advantage. Students will also understand about quality processes and techniques, and tools to monitor and improve quality, like value stream mapping.

The qualification is intended to carry UCAS points and is recognised by HE providers as meeting admission requirements for many engineering courses, including:

- BSc Hons in Mechanical Engineering
- BEng Hons in Mechatronics
- BEng Hons Electronic Engineering
- BSc Hons in Mathematics.

Students should always check the entry requirements for degree programmes at specific HE providers.

If there are larger and/or smaller versions of this qualification or it is available at different skills levels, why should the student choose this one?

The suite includes the following qualifications.

There are six specialist qualifications in both the **BTEC National Diplomas** and the **BTEC National Extended Diplomas**, which are as follows.

- **Engineering** – is aimed at giving students a wider view of the sector, which can include elements of mechanical, electrical and manufacturing engineering.
- **Electrical/Electronic Engineering** – this specialism allows students to focus on specific elements of electrical and electronic engineering, which can include electronic devices and circuits and power networks.
- **Mechanical Engineering** – this specialism covers a wide range of mechanical elements, including fluid mechanics as well as materials and their behaviours.
- **Computer Engineering** – this subject area specialises in how computers work and how they integrate into the wider picture, as well as cyber security and website design and control.
- **Manufacturing Engineering** – is for students looking to understand how things are made and the equipment, materials and processes used to create products.
- **Aeronautical Engineering** – focuses on the field of aerospace engineering, students will understand the theory of flight and aerodynamics, as well as aircraft maintenance and propulsion systems.

While each of these specialist areas prepares students to continue in this field in either employment or HE, the core of generic engineering content also allows students to progress to other specialisms in the engineering sector.

The **BTEC National Extended Diploma** is equivalent in size to 3 A Levels and typically makes up the full two-year, 16–19 study programme. It allows students to focus their studies fully on this sector.

The **BTEC National Diploma** is equivalent in size to 2 A Levels and is for students planning to work in the engineering sector. Its size means there is time in a study programme to take an additional complementary qualification to support a specialist progression route.

The **Pearson BTEC Level 3 National Extended Certificate in Engineering** is equivalent in size to 1 A Level. It is for students interested in learning about the sector alongside other fields of study, with a view to progressing to a wide range of HE courses, but not necessarily in engineering.

The **Pearson BTEC Level 3 National Foundation Diploma in Engineering** is equivalent in size to 1.5 A Levels. It is for students looking for a one-year course of full-time study, or alongside another area of study that contrasts or complements the Foundation Diploma in Engineering over a two-year, full-time study programme, with a view to progressing to a range of HE courses.

For more detail of the other qualifications listed here, and the different progression opportunities they particularly support, please refer to their statements of purpose.

This qualification is supported by the following organisations

Professional and trade bodies

Royal Aeronautical Society
The Society of Operations Engineers (SOE)

Employers

Rolls Royce
Liebherr Sunderland Works Ltd
GKN Aerospace
Wilson Tool International LTD

Higher education

The University of Manchester
University of Exeter
University of Huddersfield
Kingston University
Southampton Solent University
University of the West of England
Harper Adams University