

Pearson Higher Nationals in Engineering

Qualification Guide


First Teaching from September 2017

First Certification from 2018

Issue 3



Level
BTEC
Higher
National
Certificate



Level
BTEC
Higher
National
Diploma



Introducing your new Pearson BTEC Higher Nationals in Engineering

BTEC is the world's most successful and best-loved applied learning brand, engaging students in practical, interpersonal and thinking skills for more than thirty years.

Pearson BTECs are work-related qualifications for students taking their first steps into employment or those already in employment and seeking career development opportunities. Pearson BTECs provide progression into the workplace either directly or via study at university and are also designed to meet employer's needs. Pearson BTEC Higher National qualifications are therefore widely recognised by industry and higher education as the principal technical professional qualification at Levels 4 and 5.

The Pearson BTEC Higher National Certificate (HNC) is at level 4 (the same as the first year of a UK honours degree).

The Pearson BTEC Higher National Diploma (HND) is at level 4 and level 5 (the same as the first two years of a UK honours degree).



Professional courses developed collaboratively with subject experts

With input from industry, employers, professional bodies, tutors, students, and higher education institutions, your new Pearson BTEC Higher Nationals have been designed to better meet the needs of a changing market. The result is a qualification suite designed and developed to meet professional standards, recognised by employers and universities, which develop not only academic skills and abilities, but work-readiness skills.

The objectives of the redevelopment of the Higher Nationals have been to ensure:

- employer engagement;
- work relatedness;
- opportunities for progression to further higher education;
- alignment with UK higher education expectations; and
- qualifications which are up to date with current professional practice and include professional recognition where possible

What's new?

For your new Pearson BTEC Higher National qualifications, we are building on what you've told us you value most:

- **Essential subject knowledge** needed by engineering students to progress successfully into further study or to the world of work or continued employment;
- **A simplified structure** students undertake a substantial core of learning, required by all engineers, with limited specialism in the Higher National Certificate, building on this in the Higher National Diploma, with further specialist and optional units linked to their specialist area of study;
- **Five specialist pathways** One general and four specialist pathways at Level 4 and 5 so there is something to suit each student's preference for study and future progression plans;
- **Refreshed content** that is closely aligned with professional bodies', employers' and higher education needs for a skilled future workforce;
- **Assessments that consider cognitive skills** (what students know) along with affective and psychomotor skills (what they can do and how they behave);
- **An assessment strategy** that supports progression to Level 6 studies and also allows centres to offer assessment relevant to the local employers, thereby accommodating and enhancing different learning styles;
- **Learning outcomes** mapped against professional body standards where appropriate;
- **Unit-specific grading and Pearson-set assignments**
- **Robust quality assurance measures** that serve to ensure that all stakeholders (e.g. professional bodies, universities, employers, centres and students) can feel confident in the integrity and the integrity and value of the qualification.

Flexible choice of subject areas and progression opportunities

Core Units
Optional Units
Specialist Units

Note: If the student has no prior practical experience then it is recommended that Unit 10 Mechanical Workshop Practices is the selected optional unit

Level 4 Higher National Certificate in Engineering (General Engineering)
1 Engineering Design
2 Engineering Maths
3 Engineering Science
4 Managing a Professional Engineering Project (Pearson-set)
Plus one optional unit from General Optional Unit Bank Level 4 (see below)
Plus one optional unit from General Optional Unit Bank Level 4 (see below)
Plus one optional unit from General Optional Unit Bank Level 4 (see below)
Plus one optional unit from General Optional Unit Bank Level 4 (see below)

Level 4 Higher National Certificate in Engineering (Electrical and Electronic Engineering)
1 Engineering Design
2 Engineering Maths
3 Engineering Science
4 Managing a Professional Engineering Project (Pearson-set)
19 Electrical and Electronic Principles
Plus one optional unit from General Optional Unit Bank Level 4 (see below)
Plus one optional unit from General Optional Unit Bank Level 4 (see below)
Plus one optional unit from General Optional Unit Bank Level 4 (see below)

Level 4 Higher National Certificate in Engineering (Manufacturing Engineering)
1 Engineering Design
2 Engineering Maths
3 Engineering Science
4 Managing a Professional Engineering Project (Pearson-set)
14 Production Engineering for Manufacture
17 Quality and Process Improvement
Plus one optional unit from General Optional Unit Bank Level 4 (see below)
Plus one optional unit from General Optional Unit Bank Level 4 (see below)

Level 4 Higher National Certificate in Engineering (Mechanical Engineering)
1 Engineering Design
2 Engineering Maths
3 Engineering Science
4 Managing a Professional Engineering Project (Pearson-set)
8 Mechanical Principles
13 Fundamentals of Thermodynamics and Heat Engines
Plus one optional unit from General Optional Unit Bank Level 4 (see below)
Plus one optional unit from General Optional Unit Bank Level 4 (see below)

Level 4 Higher National Certificate in Engineering (Operations Engineering)
1 Engineering Design
2 Engineering Maths
3 Engineering Science
4 Managing a Professional Engineering Project (Pearson-set)
Plus one optional unit from Optional Unit Bank Group B (see below)
Plus one optional unit from Optional Unit Bank Group B (see below)
Plus one optional unit from Optional Unit Bank Group B (see below)
Plus one optional unit from Optional Unit Bank Group B (see below)

The new HNC and HND qualifications in Engineering offer a choice of one General Engineering pathway the choice of four specialist pathways (all pathways exist in both the HNC and HND):

- Electrical and Electronic Engineering
- Manufacturing Engineering
- Mechanical Engineering
- Operations Engineering

Each Higher National unit has a clear purpose: to cater for the increasing need for high quality professional and technical education pathways at levels 4 and 5, providing students with a clear line of sight to employment or progression to a degree at level 6.

The Higher National Certificate (HNC) is a Level 4 qualification made up of 120 credits. It is usually studied full-time over one year, or part-time over two years.

The Higher National Diploma (HND) is a Level 4 and Level 5 qualification made up of 240 credits. It is usually studied full-time over two years, or part-time over four years.

BTEC Higher Nationals consist of core units, specialist units and optional units:

- Core units are mandatory
- Specialist units are designed to provide a specific occupational focus to the qualification and are aligned to Professional Body standards
- Required combinations of optional units are clearly set out in the tables.

General Optional Unit Bank Level 4
All other pathways
5 Renewable Energy
6 Mechatronics
7 Machining and Processing of Engineering Materials
8 Mechanical Principles*
9 Materials, Properties and Testing
10 Mechanical Workshop Practices
11 Fluid Mechanics
12 Engineering Management
13 Fundamentals of Thermodynamics and Heat Engines*
14 Production Engineering for Manufacture*
15 Automation, Robotics and Programmable Logic Controllers

General Optional Unit Bank Level 4
16 Instrumentation and Control Systems
17 Quality and Process Improvement*
18 Maintenance Engineering
19 Electrical and Electronic Principles*
20 Digital Principles
21 Electrical Machines
22 Electronic Circuits and Devices*
23 Computer Aided Design and Manufacture (CAD/CAM)
29 Electro, Pneumatic and Hydraulic Systems
30 Operations and Plant Management
31 Electrical Systems and Fault Finding

General Optional Unit Bank Level 4
32 CAD for Maintenance Engineers
73 Materials Engineering with Polymers
74 Polymer Manufacturing Processes

Optional Unit Bank Group B: Operations Engineering
29 Electro, Pneumatic and Hydraulic Systems
30 Operations and Plant Management
31 Electrical Systems and Fault Finding
32 CAD for Maintenance Engineers

Flexible choice of subject areas and progression opportunities

Level 5 Higher National Diploma in Engineering (General Engineering)	Level 5 Higher National Diploma in Engineering (Electrical and Electronic Engineering)	Level 5 Higher National Diploma in Engineering (Manufacturing Engineering)	Level 5 Higher National Diploma in Engineering (Mechanical Engineering)	Level 5 Higher National Diploma in Engineering (Operations Engineering)	General Optional Unit Bank Level 4
1 Engineering Design	1 Engineering Design	1 Engineering Design	1 Engineering Design	1 Engineering Design	5 Renewable Energy
2 Engineering Maths	2 Engineering Maths	2 Engineering Maths	2 Engineering Maths	2 Engineering Maths	6 Mechatronics
3 Engineering Science	3 Engineering Science	3 Engineering Science	3 Engineering Science	3 Engineering Science	7 Machining and Processing of Engineering Materials
4 Managing a Professional Engineering Project (Pearson-set)	4 Managing a Professional Engineering Project (Pearson-set)	4 Managing a Professional Engineering Project (Pearson-set)	4 Managing a Professional Engineering Project (Pearson-set)	4 Managing a Professional Engineering Project (Pearson-set)	8 Mechanical Principles*
Plus one optional unit from General Optional Unit Bank Level 4 (see right)	19 Electrical and Electronic Principles	14 Production Engineering for Manufacture	8 Mechanical Principles	Plus one optional unit from Optional Unit Bank Group B (see below)	9 Materials, Properties and Testing
Plus one optional unit from General Optional Unit Bank Level 4 (see right)	Plus one optional unit from General Optional Unit Bank Level 4 (see right)	17 Quality and Process Improvement	13 Fundamentals of Thermodynamics and Heat Engines	Plus one optional unit from Optional Unit Bank Group B (see below)	10 Mechanical Workshop Practices
Plus one optional unit from General Optional Unit Bank Level 4 (see right)	Plus one optional unit from General Optional Unit Bank Level 4 (see right)	Plus one optional unit from General Optional Unit Bank Level 4 (see right)	Plus one optional unit from General Optional Unit Bank Level 4 (see right)	Plus one optional unit from Optional Unit Bank Group B (see below)	11 Fluid Mechanics
Plus one optional unit from General Optional Unit Bank Level 4 (see right)	Plus one optional unit from General Optional Unit Bank Level 4 (see right)	Plus one optional unit from General Optional Unit Bank Level 4 (see right)	Plus one optional unit from General Optional Unit Bank Level 4 (see right)	Plus one optional unit from Optional Unit Bank Group B (see below)	12 Engineering Management
					13 Fundamentals of Thermodynamics and Heat Engines*
					14 Production Engineering for Manufacture*
					15 Automation, Robotics and Programmable Logic Controllers
					16 Instrumentation and Control Systems
					17 Quality and Process Improvement*
					18 Maintenance Engineering
					19 Electrical and Electronic Principles*
					20 Digital Principles
					21 Electrical Machines
					22 Electronic Circuits and Devices*
					23 Computer Aided Design and Manufacture (CAD/CAM)
					29 Electro, Pneumatic and Hydraulic Systems
					30 Operations and Plant Management
					31 Electrical Systems and Fault Finding
					32 CAD for Maintenance Engineers
					73 Materials Engineering with Polymers
					74 Polymer Manufacturing Processes

Level 5 Units				
34 Research Project	34 Research Project	34 Research Project	34 Research Project	34 Research Project
35 Professional Engineering Management (Pearson-set)	35 Professional Engineering Management (Pearson-set)	35 Professional Engineering Management (Pearson-set)	35 Professional Engineering Management (Pearson-set)	35 Professional Engineering Management (Pearson-set)
39 Further Mathematics	39 Further Mathematics	48 Manufacturing Systems Engineering	36 Advanced Mechanical Principles	39 Further Mathematics
49 Lean Manufacturing	44 Industrial Power, Electronics and Storage	49 Lean Manufacturing	37 Virtual Engineering	62 Heating, Ventilation, Air Conditioning (HVAC)
Plus one optional unit from Level 5 Optional Unit Bank (see right)	45 Industrial Systems	50 Advanced Manufacturing Technology	39 Further Mathematics	63 Industrial Services
Plus one optional unit from Level 5 Optional Unit Bank (see right)	Plus one optional unit from Level 5 Optional Unit Bank (see right)	Plus one optional unit from Level 5 Optional Unit Bank (see right)	Plus one optional unit from Level 5 Optional Unit Bank (see right)	64 Thermofluids
Plus one optional unit from Level 5 Optional Unit Bank (see right)	Plus one optional unit from Level 5 Optional Unit Bank (see right)	Plus one optional unit from Level 5 Optional Unit Bank (see right)	Plus one optional unit from Level 5 Optional Unit Bank (see right)	Plus one optional unit from Level 5 Optional Unit Bank (see right)

Optional Unit Bank Group B
29 Electro, Pneumatic and Hydraulic Systems
30 Operations and Plant Management
31 Electrical Systems and Fault Finding
32 CAD for Maintenance Engineers

Core Units	Specialist Units	Optional Units
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*Optional units that are also denoted as a specialist unit in particular pathways

Level 5 Optional Unit Bank
36 Advanced Mechanical Principles
37 Virtual Engineering*
38 Further Thermodynamics
39 Further Mathematics*
40 Commercial Programming Software
41 Distributed Control Systems
42 Further PLC's
43 Further Machines and Drives
44 Industrial Power, Electronics and Storage*
45 Industrial Systems*
46 Embedded Systems
47 Analogue Electronic Systems
48 Manufacturing Systems Engineering*
49 Lean Manufacturing*
50 Advanced Manufacturing Technology*
51 Sustainability
52 Further Electrical, Electronic and Digital Principles
53 Utilisation of Electrical Power
54 Fundamentals of Control Systems
63 Industrial Services
64 Thermofluids*

Progression opportunities:

The purpose of Pearson BTEC Higher Nationals in Engineering is to develop students as professional, self-reflecting individuals, able to meet the demands of employers in the engineering sectors and adapt to a constantly changing world. The qualifications aim to widen access to higher education and enhance the career prospects of those who undertake them.

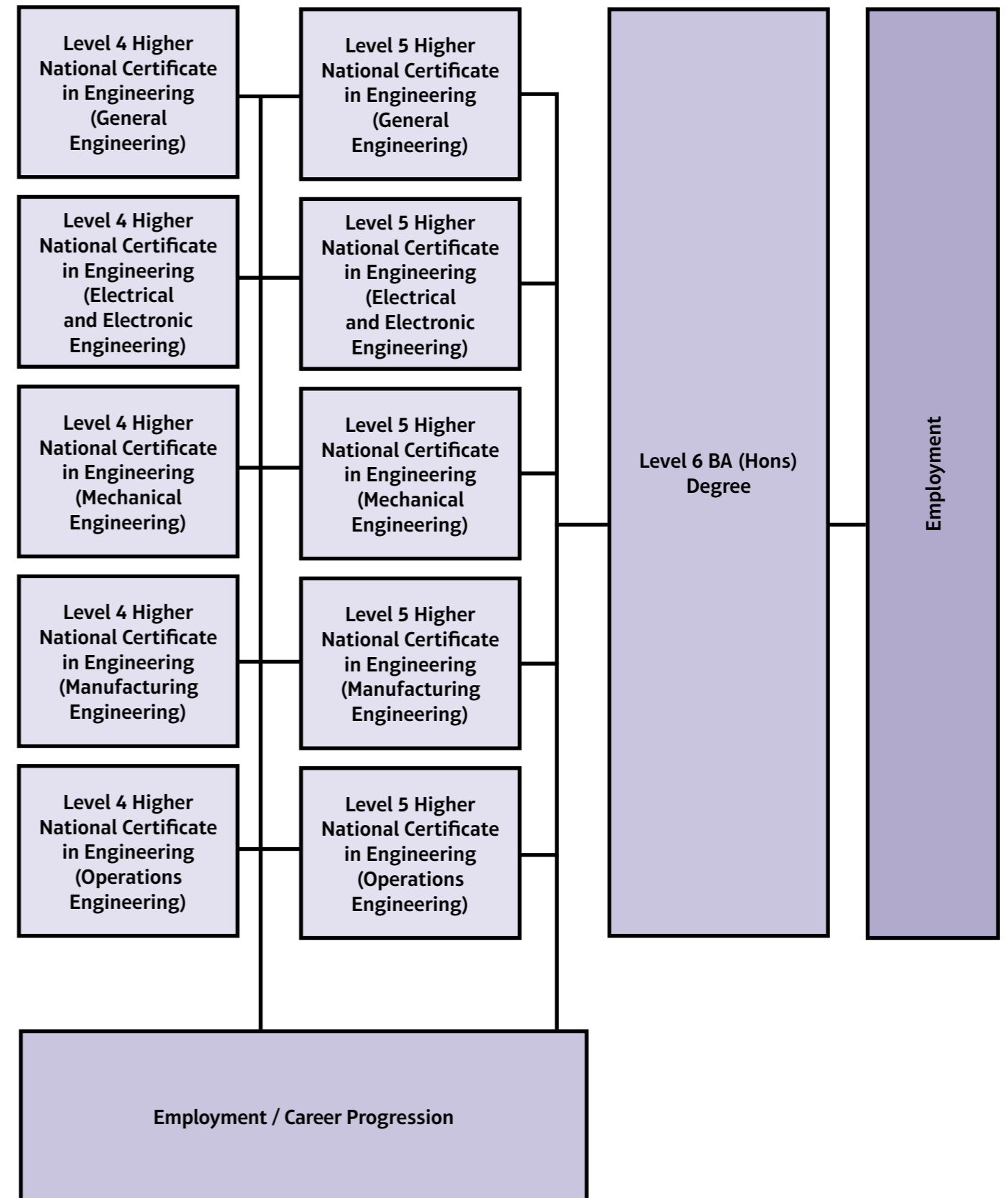
On successful completion of the Level 5 Higher National Diploma, students can develop their careers in the engineering sector through:

- Entering employment;
- Continuing existing employment;
- Linking with the appropriate Professional Body;
- Committing to Continuing Professional Development (CPD);
- Progressing to university.

Qualifications in engineering within the UK are referenced against the Engineering Council's UK specifications, which set standards at Levels 3, 6 and 8.

The Pearson BTEC Higher Nationals in Engineering are set at Level 4 and 5 and have been written with reference to the Engineering Council specification for Level 3 and 6. The content and level has been written following advice from the Engineering Professional Bodies and is intended to exempt holders of this qualification from the Level 4 and 5 requirements of these bodies, and articulate with the Level 6 in engineering degree courses.

Holders of a BTEC Higher National in Engineering meet the academic requirements for the Engineering Council Engineering Technician Standard (EngTech).



Assessment Strategy

Pearson BTECs combine a student-centred approach with a flexible, unit-based structure. Students are required to apply their knowledge to a variety of assignments and activities, with a focus on the holistic development of practical, interpersonal and higher level thinking skills. Assessment reflects not only what the student knows but also what he or she can do to succeed in employment and higher education in an ethical manner.

Pearson BTEC Higher Nationals have always allowed for a variety of forms of assessment evidence to be used, provided they are suited to the type of learning outcomes being assessed. For many units, the practical demonstration of skills is necessary and, for others, students will need to carry out their own research and analysis, working independently or as part of a team.

Resources

We are providing a wealth of support to ensure that tutors and students have the best possible experience during their course. We have worked with students and tutors worldwide to create an effective and interactive community for our qualifications, called HN Global, an exciting new online platform created by Pearson to engage with Higher National students and tutors around the world.

Created in parallel with the development of the new BTEC Higher National qualifications, HN Global houses a great number of resources for students to get the most out of their BTEC Higher National experience.

Pearson also offer Study Skills units to all learners – an online toolkit accessed on HN Global that supports the delivery, assessment and quality assurance of BTECs in centres.

www.highernationals.com

Do you need centre approval?

Providers wishing to deliver the new Pearson BTEC Higher National qualifications (Pearson BTEC Higher Nationals in Engineering - first teaching September 2017) will be subject to a new qualification approval process, more aligned with that used in UK Higher Education. Email hnqa@pearson.com or visit qualifications.pearson.com/higher-nationals for more information about the process.



FAQs

1. If a provider is already delivering the existing Higher National in Engineering qualifications do they still need to obtain approval for delivering the new qualification?

Yes, existing providers would still be required to gain approval for delivering the new Higher National qualification but the process will be simplified for centres that meet the auto approval criteria. Approval will then be provisionally granted subject to the return of a signed declaration and payment of the approval fee. More details can be found in the support section of our website (<http://qualifications.pearson.com/>).

2. How long will the approval process take?

This will depend on whether the provider is eligible for auto approval. Once an existing provider has been notified of eligibility for auto approval, the approval will remain provisional until the provider returns the signed declaration and approval. If an existing provider is ineligible and requires a desk based review, the review cannot begin until the provider confirms its intention to proceed and the approval fee is paid. New providers will go through the standard provider approval process which currently takes about 20 days.

3. Is it possible for students to change their pathway at the end of their first year on the course programme?

Yes it is. Providers will need to advise Pearson registrations team and they will be able to transfer the student's registration to the appropriate pathway.

4. If Pearson are providing Sample Assessment Materials, do providers still have to devise their own assignments and complete internal verification of assignments?

Yes they do. SAMs are for guidance and support only and can be customised and amended according to localised needs and requirements. All assignments must still be moderated as per the internal verification process.

5. How will providers know what the accreditation requirements are for Professional Bodies and what students would need to do to claim accreditation.

There will be further details and guidance for providers available on the Pearson qualifications website (<http://qualifications.pearson.com/>).

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