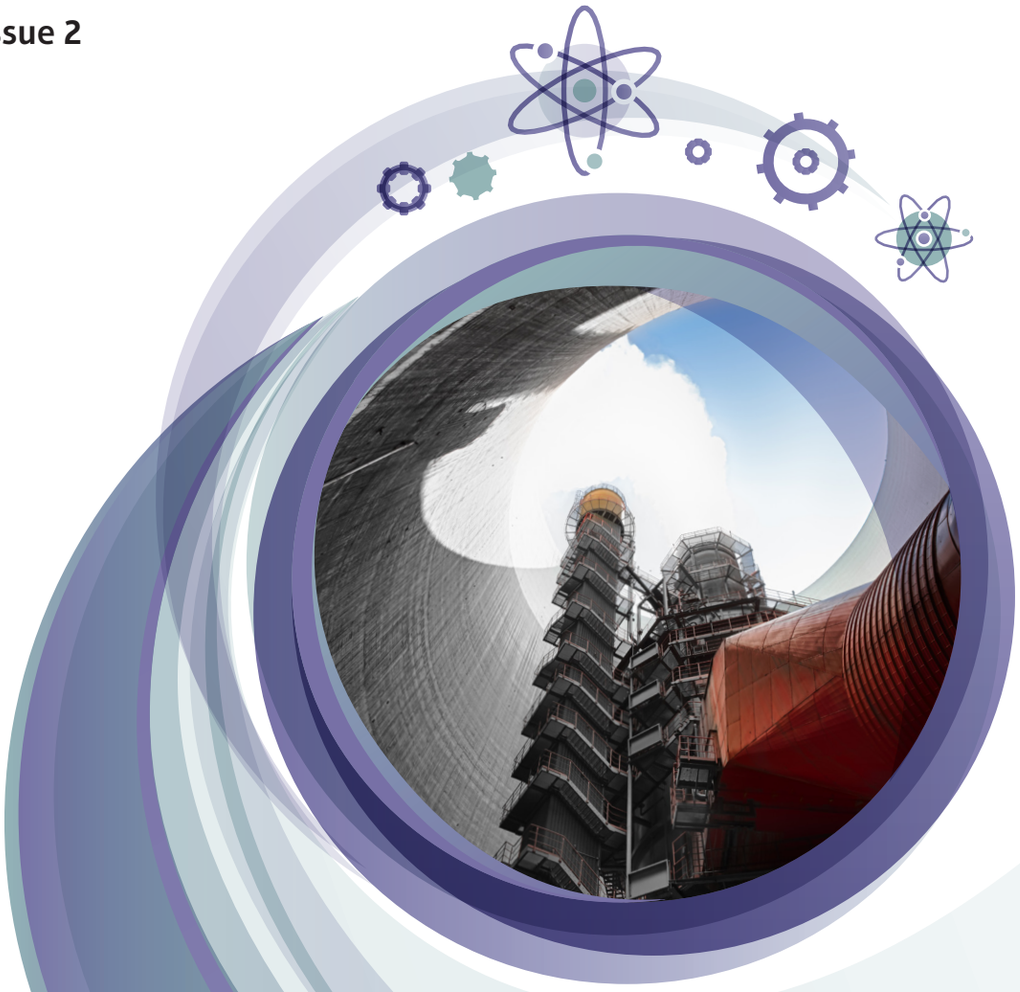
BTEC

Pearson Higher Nationals in

Nuclear Engineering

Qualification Guide

First Teaching from September 2017
First Certification from 2018
Issue 2



Level 4
BTEC Higher National Certificate

Level 5
BTEC Higher National Diploma

Pearson

Introducing your new Pearson BTEC Higher Nationals in

Nuclear 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;
- **Two discipline-specific pathways** (Electrical/Electronic and Mechanical) at Level 4 and one broad-based pathway (Nuclear Engineering) at Level 5, which reflect industries' needs for engineers skilled in one or other of these two areas, prior to Level 5 specialisation within Nuclear Engineering, 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

The Level 4 Higher National Certificate in Nuclear Engineering offers students a broad introduction to the subject area via a mandatory core of learning, while allowing for the acquisition of some sector-specific skills and experience through the specialist units, with the opportunity to pursue a particular interest through the appropriate selection of optional units

The Level 5 Higher National Diploma in Nuclear Engineering offers students a pathway designed to support progression into relevant occupational areas or onto degree-level study. This pathway is linked to Professional Body standards (where appropriate) and can provide progression towards professional status or entry to the later stages of an appropriate degree.

At Level 5 students continue to build on the essential skills, knowledge and techniques necessary for all engineers whilst working through a larger number of subject-specific specialist and optional units.

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.

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

Level 4 Higher National Certificate in Nuclear Engineering (Mechanical)
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
33 Fundamentals of Nuclear Power Engineering
Plus one optional unit from Optional Unit Bank Level 4 (see below)

Optional Unit Bank Level 4
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
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

Core Units
Specialist Units
Optional Units

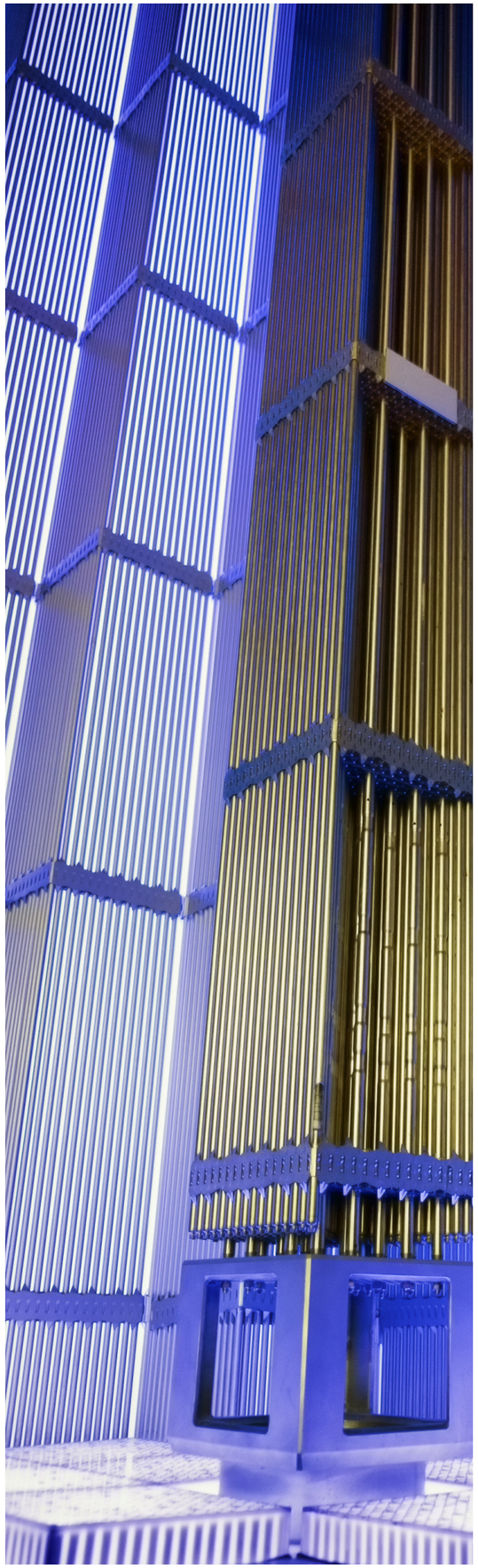
Flexible choice of subject areas and progression opportunities

Level 5 Higher National Diploma in Nuclear Engineering	
Level 4 Pathway units (Electrical and Electronic)	**Level 4 Pathway units (Mechanical)**
1 Engineering Design	1 Engineering Design
2 Engineering Maths	2 Engineering Maths
3 Engineering Science	3 Engineering Science
4 Managing a Professional Engineering Project (Pearson-set)	4 Managing a Professional Engineering Project (Pearson-set)
19 Electrical and Electronic Principles	8 Mechanical Principles
22 Electronic Circuits and Devices	13 Fundamentals of Thermodynamics and Heat Engines
33 Fundamentals of Nuclear Power Engineering	33 Fundamentals of Nuclear Power Engineering
Plus one optional unit from Optional Unit Bank Level 4 (see above)	Plus one optional unit from Optional Unit Bank Level 4 (see above)
34 Research Project	
35 Professional Engineering Management (Pearson-set)	
39 Further Mathematics	
Plus one optional unit from Optional Unit Bank Level 5 Group D (see right)	
Plus one optional unit from Optional Unit Bank Level 5 Group D (see right)	
Plus one optional unit from Optional Unit Bank Level 5 Group D (see right)	
Plus one optional unit from Optional Unit Bank Level 5 Group D or General Optional (see right)	

Core Units
Specialist Units
Optional Units

Higher National Diploma Optional Unit Bank Level 5
General Optional:
36 Advanced Mechanical Principles
37 Virtual Engineering
38 Further Thermodynamics
39 Further Mathematics
40 Commercial Programming Software
41 Distributed Control Systems
42 Further Programmable Logic Controllers (PLCs)
43 Further Electrical 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 Further Control Systems Engineering
63 Industrial Services
64 Thermofluids

Higher National Diploma Optional Unit Bank Level 5
Group D:
65 Nuclear Reactor Operations
66 Nuclear Reactor Chemistry
67 Nuclear Radiation Protection Technology
68 Nuclear Reactor Materials
69 Nuclear Fuel Cycle Technology
70 Nuclear Decommissioning and Radioactive Waste Management Technology
71 Nuclear Criticality Control
72 Nuclear Safety Case development



Progression opportunities:

The purpose of Pearson BTEC Higher Nationals in Nuclear Engineering is to develop students as professional, self-reflecting individuals, able to meet the demands of employers in the nuclear reactor sector 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.

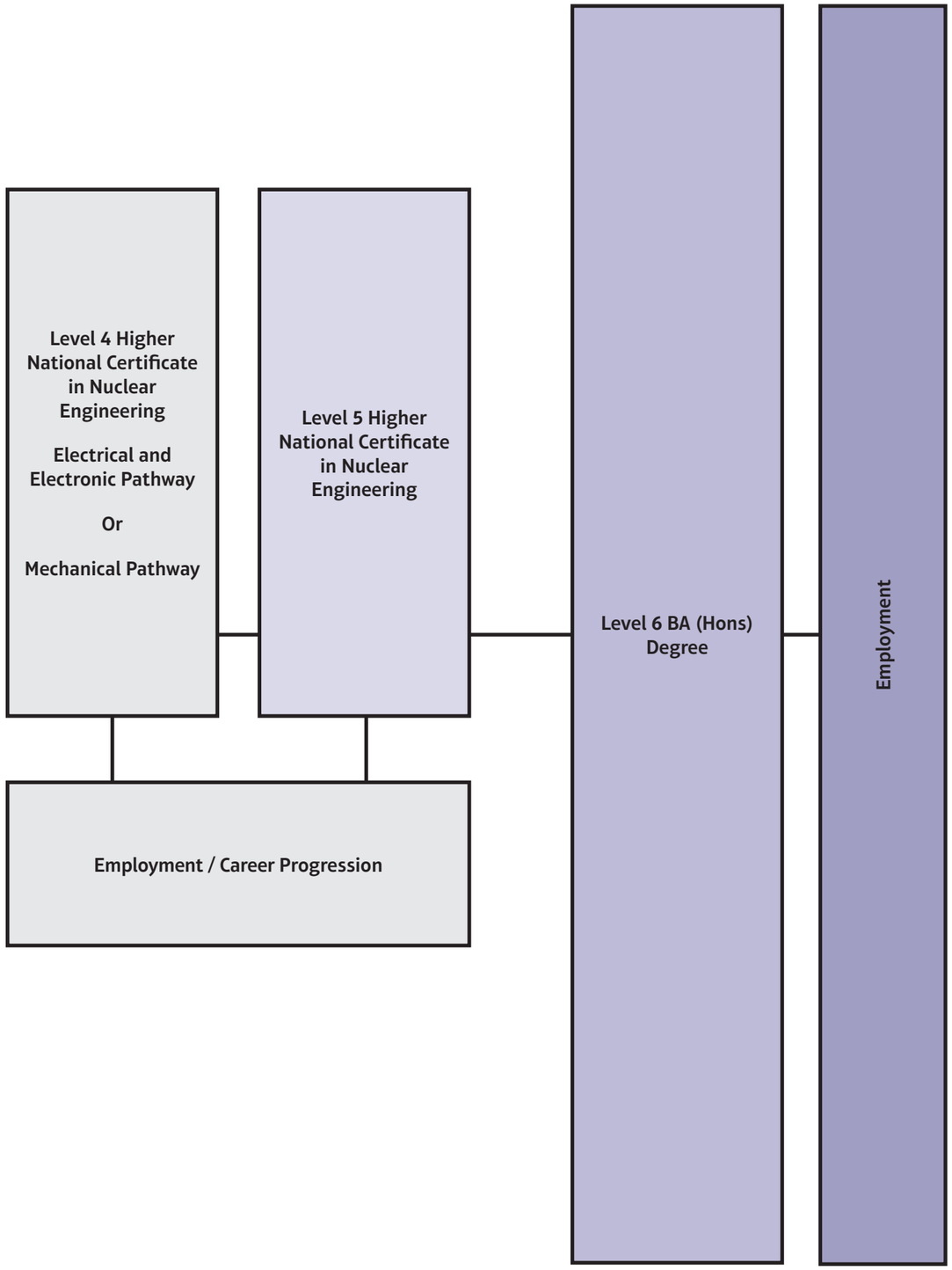
On successful completion of the Level 5 Higher National Diploma, students can develop their careers in the engineering sector through:

- 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 Nuclear 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 Nuclear 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.

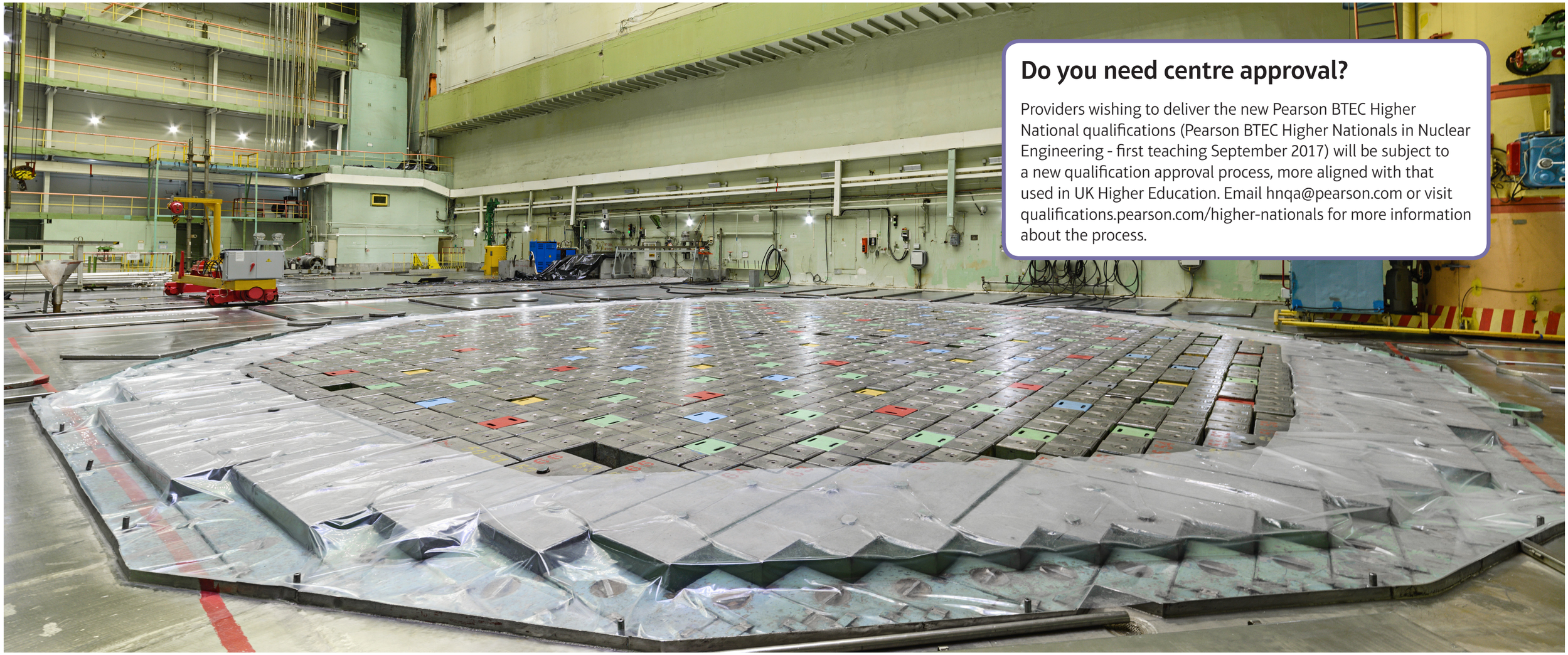
Resources

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 Nuclear 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 also be further details and guidance for providers available on the Pearson qualifications website (http://qualifications.pearson.com).

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