

Pearson BTEC Level 3 in Engineering

Specification

Pearson BTEC Level 3 Certificate

Pearson BTEC Level 3 Subsidiary Diploma

Pearson BTEC Level 3 90-credit Diploma

Pearson BTEC Level 3 Diploma

Pearson BTEC Level 3 Extended Diploma

September 2013

Issue 4

Edexcel, BTEC and LCCI qualifications

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This specification is Issue 4. Key changes are sidelined. We will inform centres of any changes to this issue. The latest issue can be found on our website at qualifications.pearson.com

These qualifications were previously entitled:

Pearson BTEC Level 3 Certificate in Engineering (QCF)

Pearson BTEC Level 3 Subsidiary Diploma in Engineering (QCF)

Pearson BTEC Level 3 90-credit Diploma in Engineering (QCF)

Pearson BTEC Level 3 Diploma in Engineering (QCF)

Pearson BTEC Level 3 Extended Diploma in Engineering (QCF)

The QNs remain unchanged.

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All information in this specification is correct at time of publication.

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Contents

The units for the **BTEC** qualifications in this specification are available on our website (www.edexcel.com).

BTEC qualification titles covered by this specification	1
What are BTEC Level 3 qualifications?	2
Pearson BTEC Level 3 Certificate – 30 credits	3
Pearson BTEC Level 3 Subsidiary Diploma – 60 credits	3
Pearson BTEC Level 3 90-credit Diploma – 90 credits	4
Pearson BTEC Level 3 Diploma – 120 credits	4
Pearson BTEC Level 3 Extended Diploma – 180 credits	4
Key features of these BTEC qualifications in Engineering	5
Rationale for these BTEC qualifications in Engineering	5
National Occupational Standards (NOS)	5
Rules of combination for Pearson BTEC Level 3 qualifications in this specification	7
Pearson BTEC Level 3 Certificate in Engineering	9
Pearson BTEC Level 3 Subsidiary Diploma in Engineering	10
Pearson BTEC Level 3 90-credit Diploma in Engineering	11
Pearson BTEC Level 3 Diploma in Engineering	13
Pearson BTEC Level 3 Extended Diploma in Engineering	15
Assessment and grading	18
Grading domains	18
Calculation of the qualification grade	19
Quality assurance of centres	21
Approval	21
Programme design and delivery	22
Mode of delivery	22
Resources	23
Delivery approach	23

Meeting local needs	23
Additional and specialist learning	24
Functional Skills	24
Personal, learning and thinking skills	24
Access and recruitment	24
Restrictions on learner entry	25
Access arrangements for learners with disabilities and specific needs	25
Recognition of Prior Learning	25
Unit format	26
Unit title	26
Level	26
Credit value	26
Guided learning hours	26
Aim and purpose	26
Unit introduction	26
Learning outcomes	27
Unit content	27
Assessment and grading grid	27
Essential guidance for tutors	28
Further information	29
Useful publications	29
How to obtain National Occupational Standards	29
Professional development and training	30
Annexe A	31
The Pearson BTEC qualification framework for the Engineering sector	31
Annexe B	33
Grading domains: BTEC level 3 generic grading domains	33

Annexe C	35
Personal, learning and thinking skills	35
Annexe D	41
Wider curriculum mapping	41
Annexe E	45
National Occupational Standards/mapping with NVQs	45
Annexe F	49
Unit mapping overview	49
Unit mapping in depth	51
Annexe G	53
Examples of calculation of qualification grade above pass grade	53
Points available for credits achieved at different levels and unit grades	53



BTEC qualification titles covered by this specification

Pearson BTEC Level 3 Certificate in Engineering

Pearson BTEC Level 3 Subsidiary Diploma in Engineering

Pearson BTEC Level 3 90-credit Diploma in Engineering

Pearson BTEC Level 3 Diploma in Engineering

Pearson BTEC Level 3 Extended Diploma in Engineering

These qualifications have been accredited to the national framework and are eligible for public funding as determined by the Department for Education (DfE) under Section 96 of the Learning and Skills Act 2000.

The qualification titles listed above feature in the funding lists published annually by the DfE and the regularly updated website www.education.gov.uk/. The Qualification Number (QN) should be used by centres when they wish to seek public funding for their learners. As well as a QN, each unit within a qualification also has a unit reference number (URN).

The qualification title, QN and URNs will appear on learners' final certification documentation.

The QNs for the qualifications in this publication are:

Pearson BTEC Level 3 Certificate in Engineering	500/8156/1
Pearson BTEC Level 3 Subsidiary Diploma in Engineering	500/7841/0
Pearson BTEC Level 3 90-credit Diploma in Engineering	600/3888/3
Pearson BTEC Level 3 Diploma in Engineering	500/8154/8
Pearson BTEC Level 3 Extended Diploma in Engineering	500/8165/2

The appropriate qualification title will appear on a learners' certificate. Learners need to be made aware of this when they are recruited by the centre and registered with Pearson.

What are BTEC Level 3 qualifications?

The BTEC qualifications in this specification are undertaken in further education, by sixth-form colleges, schools and other training providers, and have been since they were introduced in 1984. Their purpose, approaches to teaching, learning and assessment are established and understood by teaching professionals, employers and learners alike.

The BTEC qualifications in this specification are:

- Pearson BTEC Level 3 Certificate in Engineering
- Pearson BTEC Level 3 Subsidiary Diploma in Engineering
- Pearson BTEC Level 3 90-credit Diploma in Engineering
- Pearson BTEC Level 3 Diploma in Engineering
- Pearson BTEC Level 3 Extended Diploma in Engineering.

They maintain the same equivalences, benchmarks and other articulations (for example SCAAT points, UCAS Tariff points) as their predecessor qualifications. The table below identifies the titling conventions and variations between the predecessor and new qualifications:

Predecessor BTEC Nationals (accredited 2007)	BTEC Level 3 qualifications (for delivery from September 2010)
Not applicable	Pearson BTEC Level 3 Certificate
Edexcel Level 3 BTEC National Award	Pearson BTEC Level 3 Subsidiary Diploma
Not applicable	Pearson BTEC Level 3 90-credit Diploma
Edexcel Level 3 BTEC National Certificate	Pearson BTEC Level 3 Diploma
Edexcel Level 3 BTEC National Diploma	Pearson BTEC Level 3 Extended Diploma

The BTEC qualifications in this specification are designed to provide highly specialist, work-related qualifications in a range of vocational sectors. They give learners the knowledge, understanding and skills that they need to prepare for employment. These qualifications accredit the achievement for courses and programmes of study for full-time or part-time learners in schools, colleges and other training provider organisations. The qualifications provide career development opportunities for those already in work, and progression opportunities to higher education, degree and professional development programmes within the same or related areas of study, within universities and other institutions.

The BTEC qualifications in this specification provide much of the underpinning knowledge and understanding for the National Occupational Standards for the sector, where these are appropriate. They are supported by the relevant Sector Skills Councils (SSCs) and/or Standards Setting Bodies (SSBs). Certain BTEC qualifications are recognised as Technical Certificates and form part of the Apprenticeship Framework. They attract UCAS points that equate to similar-sized general qualifications within education institutions within the UK.

On successful completion of a BTEC level 3 qualification, a learner can progress to or within employment and/or continue their study in the same, or related vocational area.

Total Qualification Time

For all regulated qualifications, Pearson specifies a total number of hours that it is expected the average learner will be required to undertake in order to complete and show achievement for the qualification: this is the Total Qualification Time (TQT).

Within this, Pearson will also identify the number of Guided Learning Hours (GLH) that we expect a centre delivering the qualification will need to provide. Guided learning means activities that directly or immediately involve tutors and assessors in teaching, supervising, and invigilating learners, such as lessons, tutorials, online instruction, supervised study giving feedback on performance.

In addition to guided learning, other required learning directed by tutors or assessors will include private study, preparation for assessment and undertaking assessment when not under supervision, such as preparatory reading, revision and independent research.

These qualifications also have a credit value, which is equal to one tenth of TQT. Pearson consults with users of these qualifications in assigning TQT and credit values.

This suite of BTEC Level 3 qualifications is available in the following sizes:

- Certificate – 300 TQT (30 credits, 180 GLH)
- Subsidiary Diploma – 600 TQT (60 credits, 360 GLH)
- 90-credit Diploma – 900 TQT (90 credits, 540 GLH)
- Diploma – 1200 TQT (120 credits, 720 GLH)
- Extended Diploma – 1800 TQT (180 credits, 1080 GLH).

Pearson BTEC Level 3 Certificate – 30 credits

The 30-credit BTEC Level 3 Certificate offers a specialist qualification that focuses on particular aspects of employment within the appropriate vocational sector. The BTEC Level 3 Certificate is a qualification which can extend a learner's programme of study and give vocational emphasis. The BTEC Level 3 Certificate is broadly equivalent to one GCE AS Level.

The BTEC Level 3 Certificate is also suitable for more mature learners, who wish to follow a vocational programme of study as part of their continued professional development or who want to move to a different area of employment.

Pearson BTEC Level 3 Subsidiary Diploma – 60 credits

The 60-credit BTEC Level 3 Subsidiary Diploma extends the specialist work-related focus of the BTEC Level 3 Certificate and covers the key knowledge and practical skills required in the appropriate vocational sector. The BTEC Level 3 Subsidiary Diploma offers greater flexibility and a choice of emphasis through the optional units. It is broadly equivalent to one GCE A Level.

The BTEC Level 3 Subsidiary Diploma offers an engaging programme for those who are clear about the area of employment that they wish to enter. These learners may wish to extend their programme through the study of a general qualifications such as GCE AS Levels, additional specialist learning (for example through another BTEC qualification) or a complementary NVQ. These learning programmes can be developed to allow learners to study related and complementary qualifications without duplication of content.

For adult learners, the BTEC Level 3 Subsidiary Diploma can extend their experience of work in a particular sector. It may also be a suitable qualification for those wishing to change career or move into a particular area of employment following a career break.

Pearson BTEC Level 3 90-credit Diploma – 90 credits

This qualification broadens and expands the specialist work-related focus of the BTEC Level 3 Subsidiary Diploma and encompasses the essential skills, knowledge and understanding needed to gain confidence and progression.

There is potential for the qualification to prepare learners for progression within education or into employment in the appropriate vocational sector and it is suitable for those who have decided that they wish to study in detail or work in a particular area of work. It is broadly equivalent to 1.5 GCE A Levels and provides a programme of study manageable in a year so that learners can bank and then build on their achievement. In this way it encourages progression for those learners who wish to undertake a one-year course of study because of individual circumstances.

Some learners may wish to gain the qualification in order to enter a specialist area of employment or to progress to a larger or different level 3 programme. Other learners may want to extend the specialism they studied on the BTEC Level 3 Certificate or the BTEC Level 3 Subsidiary Diploma programme. Learners may also be able to use the BTEC Level 3 90-credit Diploma to gain partial achievement and have the requisite skills, knowledge and understanding needed in the sector.

For adult learners the BTEC Level 3 90-credit Diploma can extend their experience of working in a particular sector. It could also be a suitable qualification for those wishing to change career or move into a particular area of employment following a career break.

Pearson BTEC Level 3 Diploma – 120 credits

The 120-credit BTEC Level 3 Diploma broadens and expands the specialist work-related focus from the BTEC Level 3 Subsidiary Diploma and the BTEC Level 3 90-credit Diploma. There is potential for the qualification to prepare learners for employment in the appropriate vocational sector and it is suitable for those who have decided that they wish to enter a particular area of work. It is broadly equivalent to two GCE A Levels.

Some learners may wish to gain the qualification in order to enter a specialist area of employment or to progress to a level 4 programme. Other learners may want to extend the specialism they studied on the BTEC Level 3 Certificate, BTEC Level 3 Subsidiary Diploma or BTEC Level 3 90-credit Diploma programme.

Pearson BTEC Level 3 Extended Diploma – 180 credits

The 180-credit BTEC Level 3 Extended Diploma extends and deepens the specialist work-related focus from the BTEC Level 3 90-credit Diploma and the BTEC Level 3 Diploma. There is potential for the qualification to prepare learners for appropriate direct employment in the vocational sector and it is suitable for those who have decided that they clearly wish to enter a particular specialist area of work. It is broadly equivalent to three GCE A Levels.

Some learners may wish to gain the qualification in order to enter a specialist area of employment or to progress to a higher education foundation degree, HND or other professional development programme. Other learners may want to extend the specialist nature of the subjects they studied on the Level 3 BTEC Diploma or another programme of study.

Key features of these BTEC qualifications in Engineering

The BTEC qualifications in this specification have been developed in the engineering sector to:

- give education and training for employees in the engineering industries
- give Engineering employees in the mechanical engineering sector opportunities to achieve a nationally recognised level 3 vocationally-specific qualification
- give full-time learners the opportunity to enter employment in the mechanical engineering sector or to progress to vocational qualifications such as the Pearson BTEC Higher Nationals in Mechanical Engineering
- give learners the opportunity to develop a range of skills and techniques, personal skills and attributes essential for successful performance in working life.

Rationale for these BTEC qualifications in Engineering

The engineering sector continues to suffer from a skills gap and needs to keep up with rapidly developing technologies. These BTEC qualifications in Engineering have been designed to give new entrants to the engineering sector the underpinning knowledge and specific skills needed to meet the needs of modern mechanical engineering industries.

Many of the units have strong links to the knowledge and evidence requirements of the SEMTA National Occupational Standards and relevant NVQs at Level 3 and will provide learners with opportunities for progression within and into employment. The qualifications have also been designed so that learners can progress into Higher Education, for example to BTEC Higher Nationals and undergraduate engineering degree qualifications.

These BTEC qualifications in Engineering have been designed with flexible qualification structures and provide a wide range of units so that learners can focus on their chosen career or area of interest. The qualifications provide opportunities for learners who intend progressing into senior technician roles as well as for those who are not yet based in industry and wish to gain a sound understanding of engineering.

Several of the core units are common across different engineering titles and provide learners with the required underpinning knowledge of health and safety, mathematics, science, communications and project planning and implementation for success in the specialist units and the engineering workplace. The vocational focus of each qualification is provided through the specialist units.

National Occupational Standards (NOS)

These BTEC qualifications are designed to provide much of the underpinning knowledge and understanding for the National Occupational Standards (NOS), as well as developing practical skills in preparation for work and possible achievement of NVQs. NOS form the basis of National Vocational Qualifications (NVQs). The qualifications in this specification do not purport to deliver occupational competence in the sector, which should be demonstrated in a work context.

Each unit in the specification identifies links to elements of the NOS.



The Pearson BTEC Level 3 qualifications in Engineering relate to the following NOS:

- Level 3 NVQ in Mechanical Manufacturing Engineering
- Level 3 NVQ in Business Improvement Techniques
- Level 3 NVQ in Engineering Leadership
- Level 3 NVQ in Engineering Maintenance
- Level 3 NVQ in Electrical and Electronic Engineering
- Level 3 NVQ in Engineering Technical Support
- Level 3 NVQ in Installation and Commissioning
- Level 3 NVQ in Materials Processing and Finishing
- Level 3 NVQ in Fabrication and Welding
- Level 3 NVQ in Aeronautical Engineering.

Rules of combination for Pearson BTEC Level 3 qualifications in this specification

The rules of combination specify the:

- total credit value of the qualification
- the minimum credit to be achieved at, or above, the level of the qualification
- the mandatory unit credit
- the optional unit credit
- the maximum credit that can come from other level 3 BTEC units in this qualification suite.

When combining units for a BTEC qualification, it is the centre's responsibility to ensure that the following rules of combination are adhered to.

Pearson BTEC Level 3 Certificate

- 1 Qualification credit value: a minimum of 30 credits.
- 2 Minimum credit to be achieved at, or above, the level of the qualification: 23 credits.
- 3 Mandatory unit credit: 10 credits.
- 4 Optional unit credit: 20.

Pearson BTEC Level 3 Subsidiary Diploma

- 1 Qualification credit value: a minimum of 60 credits.
- 2 Minimum credit to be achieved at, or above, the level of the qualification: 45 credits.
- 3 Mandatory unit credit: 20 credits.
- 4 Optional unit credit: 40.
- 5 A maximum of 10 optional credits can come from other level 3 BTEC units to meet local needs.

Pearson BTEC Level 3 90-credit Diploma

- 1 Qualification credit value: a minimum of 90 credits.
- 2 Minimum credit to be achieved at, or above, the level of the qualification: 68 credits.
- 3 Mandatory unit credit: 10 credits.
- 4 Optional unit credit: 80 credits.
- 5 A maximum of 10 optional credits can come from other level 3 BTEC units to meet local needs.

Pearson BTEC Level 3 Diploma

- 1 Qualification credit value: a minimum of 120 credits.
- 2 Minimum credit to be achieved at, or above, the level of the qualification: 90 credits.
- 3 Mandatory unit credit: 70 credits.
- 4 Optional unit credit: 50.
- 5 A maximum of 20 optional credits can come from other level 3 or level 4 BTEC units to meet local needs.

Pearson BTEC Level 3 Extended Diploma

- 1 Qualification credit value: a minimum of 180 credits.
- 2 Minimum credit to be achieved at, or above, the level of the qualification: 135 credits.
- 3 Mandatory unit credit: 70 credits.
- 4 Optional unit credit: 110.
- 5 A maximum of 30 optional credits can come from other level 3 or level 4 BTEC units to meet local needs.

Pearson BTEC Level 3 Certificate in Engineering

The Pearson BTEC Level 3 Certificate in Engineering is 30 credits and has 180 guided learning hours. It consists of **one** mandatory unit **plus** optional units that provide for a combined total of 30 credits (where at least 23 credits must be at level 3 or above).

The units for the BTEC qualifications in this specification are available on our website (www.edexcel.com).

Pearson BTEC Level 3 Certificate in Engineering			
Unit	Mandatory units	Credit	Level
1	Health and Safety in the Engineering Workplace	10	3
Unit	Optional units		
4	Mathematics for Engineering Technicians	10	3
5	Mechanical Principles and Applications	10	3
6	Electrical and Electronic Principles	10	3
10	Properties and Applications of Engineering Materials	10	3
12	Applications of Mechanical Systems in Engineering	10	3
16	Engineering Drawing for Technicians	10	3
19	Mechanical Measurement and Inspection Techniques	10	3
21	Engineering Secondary and Finishing Techniques	10	3
22	Fabrication Processes and Technology	10	3
23	Welding Technology	10	3
25	Selecting and Using Programmable Controllers	10	3
26	Applications of Computer Numerical Control in Engineering	10	3
30	Setting and Proving Secondary Processing Machines	10	3
31	Computer Aided Manufacturing	10	3
35	Principles and Applications of Electronic Devices and Circuits	10	3
39	Metallurgical Techniques	10	3
44	Engineering Maintenance Procedures and Techniques	10	3
45	Monitoring and Fault Diagnosis of Engineering Systems	10	3
48	Function and Characteristics of Railway Signalling Systems	10	3
53	Electronic Measurement and Testing	10	3
56	Railway Infrastructure Construction and Maintenance	10	3
59	Microprocessor Systems and Applications	10	3
61	Features and Applications of Electrical Machines	10	3
67	Theory of Flight	10	3
74	Aircraft Maintenance Practices	10	3
141	The Principles of Photonics	10	3

Pearson BTEC Level 3 Subsidiary Diploma in Engineering

The Pearson BTEC Level 3 Subsidiary Diploma in Engineering is 60 credits and has 360 guided learning hours. It consists of **two** mandatory units **plus** optional units that provide for a combined total of 60 credits (where at least 45 credits must be at level 3 or above).

The units for the BTEC qualifications in this specification are available on our website (www.edexcel.com).

Pearson BTEC Level 3 Subsidiary Diploma in Engineering			
Unit	Mandatory units	Credit	Level
1	Health and Safety in the Engineering Workplace	10	3
Unit	Specialist mandatory unit – choose either unit 5 or unit 6		
5	Mechanical Principles and Applications	10	3
6	Electrical and Electronic Principles	10	3
Unit	Optional units		
4	Mathematics for Engineering Technicians	10	3
10	Properties and Applications of Engineering Materials	10	3
12	Applications of Mechanical Systems in Engineering	10	3
16	Engineering Drawing for Technicians	10	3
19	Mechanical Measurement and Inspection Techniques	10	3
21	Engineering Secondary and Finishing Techniques	10	3
22	Fabrication Processes and Technology	10	3
23	Welding Technology	10	3
25	Selecting and Using Programmable Controllers	10	3
26	Applications of Computer Numerical Control in Engineering	10	3
30	Setting and Proving Secondary Processing Machines	10	3
31	Computer Aided Manufacturing	10	3
35	Principles and Applications of Electronic Devices and Circuits	10	3
39	Metallurgical Techniques	10	3
44	Engineering Maintenance Procedures and Techniques	10	3
45	Monitoring and Fault Diagnosis of Engineering Systems	10	3
48	Function and Characteristics of Railway Signalling Systems	10	3
53	Electronic Measurement and Testing	10	3
56	Railway Infrastructure Construction and Maintenance	10	3
59	Microprocessor Systems and Applications	10	3
61	Features and Applications of Electrical Machines	10	3
67	Theory of Flight	10	3
74	Aircraft Maintenance Practices	10	3
141	The Principles of Photonics	10	3
142	Fault Diagnosis and Maintenance of Communications Equipment	9	3
143	Communication Technologies	10	3
144	Telecommunications Principles	10	3

Pearson BTEC Level 3 90-credit Diploma in Engineering

The Pearson BTEC Level 3 90-credit Diploma in Engineering is 90 credits and has 540 guided learning hours. It consists of **two** mandatory units **plus** optional units that provide for a combined total of 90 credits.

The units for the BTEC qualifications in this specification are available on our website (www.edexcel.com).

Pearson BTEC Level 3 90-credit Diploma in Engineering			
Unit	Mandatory units	Credit	Level
1	Health and Safety in the Engineering Workplace	10	3
Unit	Specialist mandatory unit – choose either unit 5 or unit 6		
5	Mechanical Principles and Applications	10	3
6	Electrical and Electronic Principles	10	3
Unit	Optional units		
4	Mathematics for Engineering Technicians	10	3
7	Business Operations in Engineering	10	3
8	Engineering Design	10	3
9	Commercial Aspects of Engineering Organisations	10	3
10	Properties and Applications of Engineering Materials	10	3
11	Further Mechanical Principles and Applications	10	3
12	Applications of Mechanical Systems in Engineering	10	3
13	Principles and Applications of Fluid Mechanics	10	3
14	Principles and Applications of Thermodynamics	10	3
15	Electro, Pneumatic and Hydraulic Systems and Devices	10	3
16	Engineering Drawing for Technicians	10	3
17	Computer Aided Drafting in Engineering	10	3
18	Advanced Mechanical Principles and Applications	10	3
19	Mechanical Measurement and Inspection Techniques	10	3
20	Engineering Primary Forming Processes	10	3
21	Engineering Secondary and Finishing Techniques	10	3
22	Fabrication Processes and Technology	10	3
23	Welding Technology	10	3
24	Industrial Process Measurement	10	3
25	Selection and Using Programmable Controllers	10	3
26	Applications of Computer Numerical Control in Engineering	10	3
27	Welding Principles	10	3
28	Further Mathematics for Engineering Technicians	10	3
29	Manufacturing Planning	10	3
30	Setting and Proving Secondary Processing Machines	10	3
31	Computer Aided Manufacturing	10	3
32	Production System Design	10	3
33	Six Sigma Quality	10	3
34	Electronic Circuit Design and Manufacture	10	3

Pearson BTEC Level 3 90-credit Diploma in Engineering			
Unit	Optional units <i>continued</i>	Credit	Level
35	Principles and Applications of Electronic Devices and Circuits	10	3
39	Metallurgical Techniques	10	3
44	Engineering Maintenance Procedures and Techniques	10	3
45	Monitoring and Fault Diagnosis of Engineering Systems	10	3
46	Principles and Applications of Engineering Measurement Systems	10	3
47	Industrial Plant and Process Control	10	3
48	Function and Characteristics of Railway Signalling Systems	10	3
51	Electrical Technology	10	3
52	Electrical Installation	10	3
53	Electronic Measurement and Testing	10	3
56	Railway Infrastructure Construction and Maintenance	10	3
57	Principles and Applications of Analogue Electronics	10	3
58	Construction and Applications of Digital Systems	10	3
59	Microprocessor Systems and Applications	10	3
60	Electronic Fault-finding	10	3
61	Features and Applications of Electrical Machines	10	3
62	Principles and Operation of Three-Phase Systems	10	3
63	Three-Phase Motors and Drives	10	3
67	Theory of Flight	10	3
74	Aircraft Maintenance Practices	10	3
141	The Principles of Photonics	10	3
142	Fault Diagnosis and Maintenance of Communications Equipment	9	3
143	Communication Technologies	10	3
144	Telecommunications Principles	10	3
5	Mechanical Principles and Applications*	10	3
6	Electrical and Electronic Principles*	10	3

* When not taken as a specialist mandatory unit

Pearson BTEC Level 3 Diploma in Engineering

The Pearson BTEC Level 3 Diploma in Engineering is 120 credits and has 720 guided learning hours. It consists of **six** mandatory units **plus** optional units that provide for a combined total of 120 credits (where at least 90 credits must be at level 3 or above).

The units for the BTEC qualifications in this specification are available on our website (www.edexcel.com).

Pearson BTEC Level 3 Diploma in Engineering			
Unit	Mandatory units	Credit	Level
1	Health and Safety in the Engineering Workplace	10	3
2	Communications for Engineering Technicians	10	3
3	Engineering Project	20	3
4	Mathematics for Engineering Technicians	10	3
5	Mechanical Principles and Applications	10	3
6	Electrical and Electronic Principles	10	3
Unit	Optional units		
7	Business Operations in Engineering	10	3
8	Engineering Design	10	3
9	Commercial Aspects of Engineering Organisations	10	3
10	Properties and Applications of Engineering Materials	10	3
11	Further Mechanical Principles and Applications	10	3
12	Applications of Mechanical Systems in Engineering	10	3
13	Principles and Applications of Fluid Mechanics	10	3
14	Principles and Applications of Thermodynamics	10	3
15	Electro, Pneumatic and Hydraulic Systems and Devices	10	3
16	Engineering Drawing for Technicians	10	3
17	Computer Aided Drafting in Engineering	10	3
18	Advanced Mechanical Principles and Applications	10	3
19	Mechanical Measurement and Inspection Techniques	10	3
20	Engineering Primary Forming Processes	10	3
21	Engineering Secondary and Finishing Techniques	10	3
22	Fabrication Processes and Technology	10	3
23	Welding Technology	10	3
24	Industrial Process Measurement	10	3
25	Selecting and Using Programmable Controllers	10	3
26	Applications of Computer Numerical Control in Engineering	10	3
27	Welding Principles	10	3
28	Further Mathematics for Engineering Technicians	10	3
29	Manufacturing Planning	10	3
30	Setting and Proving Secondary Processing Machines	10	3
31	Computer Aided Manufacturing	10	3
32	Production System Design	10	3
33	Six Sigma Quality	10	3
34	Electronic Circuit Design and Manufacture	10	3

Pearson BTEC Level 3 Diploma in Engineering			
Unit	Optional units <i>continued</i>	Credit	Level
35	Principles and Applications of Electronic Devices and Circuits	10	3
39	Metallurgical Techniques	10	3
44	Engineering Maintenance Procedures and Techniques	10	3
45	Monitoring and Fault Diagnosis of Engineering Systems	10	3
46	Principles and Applications of Engineering Measurement Systems	10	3
47	Industrial Plant and Process Control	10	3
48	Function and Characteristics of Railway Signalling Systems	10	3
50	Industrial Process Controllers	10	3
51	Electrical Technology	10	3
52	Electrical Installation	10	3
53	Electronic Measurement and Testing	10	3
56	Railway Infrastructure Construction and Maintenance	10	3
57	Principles and Applications of Analogue Electronics	10	3
58	Construction and Applications of Digital Systems	10	3
59	Microprocessor Systems and Applications	10	3
60	Electronic Fault-finding	10	3
61	Features and Applications of Electrical Machines	10	3
62	Principles and Operation of Three-Phase Systems	10	3
63	Three-Phase Motors and Drives	10	3
64	Further Electrical Principles	10	3
67	Theory of Flight	10	3
74	Aircraft Maintenance Practices	10	3
132	Industrial Robot Technologies	10	3
141	The Principles of Photonics	10	3
142	Fault Diagnosis and Maintenance of Communications Equipment	9	3
143	Communication Technologies	10	3
144	Telecommunications Principles	10	3
2	Vehicle Engine Principles, Operation, Service and Repair*	10	3
7	Vehicle Electrical Charging and Starting Systems*	10	3
11	Vehicle Engine Management Systems*	10	3
45	Basic Polymer Technology**	10	3
46	Plastics Materials**	10	3
47	Plastics Processing**	10	3
48	Polymer Process Engineering**	10	3
49	Rubber Products and Specialist Elastomers**	10	3
50	Rubber Technology**	10	3

*Unit taken from the Pearson BTEC Level 3 Diploma in Vehicle Technology

**Unit taken from the Pearson BTEC Level 3 Diploma in Applied Science

Pearson BTEC Level 3 Extended Diploma in Engineering

The Pearson BTEC Level 3 Extended Diploma in Engineering is 180 credits and has 1080 guided learning hours. It consists of **six** mandatory units **plus** optional units that provide for a combined total of 180 credits (where at least 135 credits must be at level 3 or above).

The units for the BTEC qualifications in this specification are available on our website (www.edexcel.com).

Pearson BTEC Level 3 Extended Diploma in Engineering			
Unit	Mandatory units	Credit	Level
1	Health and Safety in the Engineering Workplace	10	3
2	Communications for Engineering Technicians	10	3
3	Engineering Project	20	3
4	Mathematics for Engineering Technicians	10	3
5	Mechanical Principles and Applications	10	3
6	Electrical and Electronic Principles	10	3
Unit	Optional units		
7	Business Operations in Engineering	10	3
8	Engineering Design	10	3
9	Commercial Aspects of Engineering Organisations	10	3
10	Properties and Applications of Engineering Materials	10	3
11	Further Mechanical Principles and Applications	10	3
12	Applications of Mechanical Systems in Engineering	10	3
13	Principles and Applications of Fluid Mechanics	10	3
14	Principles and Applications of Thermodynamics	10	3
15	Electro, Pneumatic and Hydraulic Systems and Devices	10	3
16	Engineering Drawing for Technicians	10	3
17	Computer Aided Drafting in Engineering	10	3
18	Advanced Mechanical Principles and Applications	10	3
19	Mechanical Measurement and Inspection Techniques	10	3
20	Engineering Primary Forming Processes	10	3
21	Engineering Secondary and Finishing Techniques	10	3
22	Fabrication Processes and Technology	10	3
23	Welding Technology	10	3
24	Industrial Process Measurement	10	3
25	Selecting and Using Programmable Controllers	10	3
26	Applications of Computer Numerical Control in Engineering	10	3
27	Welding Principles	10	3
28	Further Mathematics for Engineering Technicians	10	3
29	Manufacturing Planning	10	3
30	Setting and Proving Secondary Processing Machines	10	3
31	Computer Aided Manufacturing	10	3
32	Production System Design	10	3
33	Six Sigma Quality	10	3

Pearson BTEC Level 3 Extended Diploma in Engineering			
Unit	Optional units <i>continued</i>	Credit	Level
34	Electronic Circuit Design and Manufacture	10	3
35	Principles and Applications of Electronic Devices and Circuits	10	3
39	Metallurgical Techniques	10	3
44	Engineering Maintenance Procedures and Techniques	10	3
45	Monitoring and Fault Diagnosis of Engineering Systems	10	3
46	Principles and Applications of Engineering Measurement Systems	10	3
47	Industrial Plant and Process Control	10	3
48	Function and Characteristics of Railway Signalling Systems	10	3
50	Industrial Process Controllers	10	3
51	Electrical Technology	10	3
52	Electrical Installation	10	3
53	Electronic Measurement and Testing	10	3
56	Railway Infrastructure Construction and Maintenance	10	3
57	Principles and Applications of Analogue Electronics	10	3
58	Construction and Applications of Digital Systems	10	3
59	Microprocessor Systems and Applications	10	3
60	Electronic Fault-finding	10	3
61	Features and Applications of Electrical Machines	10	3
62	Principles and Operation of Three-Phase Systems	10	3
63	Three-Phase Motors and Drives	10	3
64	Further Electrical Principles	10	3
67	Theory of Flight	10	3
74	Aircraft Maintenance Practices	10	3
132	Industrial Robot Technologies	10	3
141	The Principles of Photonics	10	3
142	Fault Diagnosis and Maintenance of Communications Equipment	9	3
143	Communication Technologies	10	3
144	Telecommunications Principles	10	3
2	Vehicle Engine Principles, Operation, Service and Repair*	10	3
7	Vehicle Electrical Charging and Starting Systems*	10	3
11	Vehicle Engine Management Systems*	10	3
45	Basic Polymer Technology**	10	3
46	Plastics Materials**	10	3
47	Plastics Processing**	10	3
48	Polymer Process Engineering**	10	3

Pearson BTEC Level 3 Extended Diploma in Engineering			
Unit	Optional units <i>continued</i>	Credit	Level
49	Rubber Products and Specialist Elastomers**	10	3
50	Rubber Technology**	10	3
3	Mathematics for Engineering Technicians***	5	2
4	Applied Electrical and Mechanical Science for Engineering***	5	2

*Unit taken from the Pearson BTEC Level 3 Diploma in Vehicle Technology

**Unit taken from the Pearson BTEC Level 3 Diploma in Applied Science

***Unit taken from the Pearson BTEC Level 2 Firsts in Engineering

Assessment and grading

All units are internally assessed in the BTEC qualifications in this specification.

All assessment for the BTEC qualifications in this specification is criterion referenced, based on the achievement of specified learning outcomes. Each unit within the qualification has specified assessment and grading criteria which are to be used for grading purposes. A summative unit grade can be awarded at pass, merit or distinction:

- to achieve a 'pass' a learner must have satisfied **all** the pass assessment criteria
- to achieve a 'merit' a learner must additionally have satisfied **all** the merit grading criteria
- to achieve a 'distinction' a learner must additionally have satisfied **all** the distinction grading criteria.

Learners who complete the unit but who do not meet all the pass criteria are graded 'unclassified'.

Grading domains

The grading criteria are developed in relation to grading domains which are exemplified by a number of indicative characteristics at the level of the qualification.

There are four BTEC grading domains:

- application of knowledge and understanding
- development of practical and technical skills
- personal development for occupational roles
- application of generic skills.

Please refer to *Annexe B* which shows the merit and distinction indicative characteristics.

Guidance

The purpose of assessment is to ensure that effective learning has taken place to give learners the opportunity to:

- meet the assessment and grading criteria and
- achieve the learning outcomes within the units.

All the assignments created by centres should be reliable and fit for purpose, and should build on the assessment and grading criteria. Assessment tasks and activities should enable learners to produce valid, sufficient and reliable evidence that relates directly to the specified criteria. Centres should enable learners to produce evidence in a variety of different forms, including written reports, graphs and posters, along with projects, performance observation and time-constrained assessments.

Centres are encouraged to emphasise the practical application of the assessment and grading criteria, providing a realistic scenario for learners to adopt, and making maximum use of practical activities and work experience. The creation of assignments that are fit for purpose is vital to achievement and their importance cannot be over-emphasised.

The assessment and grading criteria must be clearly indicated in the fit-for-purpose assignments. This gives learners focus and helps with internal verification and standardisation processes. It will also help to ensure that learner feedback is specific to the assessment and grading criteria.

When looking at the assessment and grading grids and designing assignments, centres are encouraged to identify common topics and themes.

The units include guidance on appropriate assessment methodology. A central feature of vocational assessment is that it allows for assessment to be:

- current, i.e. to reflect the most recent developments and issues
- local, i.e. to reflect the employment context of the delivering centre
- flexible to reflect learner needs, i.e. at a time and in a way that matches the learner's requirements so that they can demonstrate achievement.

Calculation of the qualification grade

Pass qualification grade

Learners who achieve the minimum eligible credit value specified by the rule of combination will achieve the qualification at pass grade (see *Rules of combination for Pearson BTEC Level 3 qualifications in this specification*).

Qualification grades above pass grade

Learners will be awarded a merit or distinction or distinction* qualification grade (or combination of these grades appropriate to the qualification) by the aggregation of points gained through the successful achievement of individual units. The number of points available is dependent on the unit level and grade achieved, and the credit size of the unit (as shown in the *points available for credits achieved at different levels and unit grades* below).

Points available for credits achieved at different levels and unit grades

The table below shows the **number of points scored per credit** at the unit level and grade.

Unit level	Points per credit		
	Pass	Merit	Distinction
Level 2	5	6	7
Level 3	7	8	9
Level 4	9	10	11

Learners who achieve the correct number of points within the ranges shown in the 'qualification grade' table will achieve the qualification merit or distinction or distinction* grade (or combinations of these grades appropriate to the qualification).

Qualification grade

BTEC Level 3 Certificate

Points range above pass grade	Grade	
230-249	Merit	M
250-259	Distinction	D
260 and above	Distinction*	D*

BTEC Level 3 Subsidiary Diploma

Points range above pass grade	Grade	
460-499	Merit	M
500-519	Distinction	D
520 and above	Distinction*	D*

BTEC Level 3 90-credit Diploma

Points range above pass grade	Grade
660-689	MP
690-719	MM
720-749	DM
750-769	DD
770-789	D*D
790 and above	D*D*

BTEC Level 3 Diploma

Points range above pass grade	Grade
880-919	MP
920-959	MM
960-999	DM
1000-1029	DD
1030-1059	D*D
1060 and above	D*D*

BTEC Level 3 Extended Diploma

Points range above pass grade	Grade
1300-1339	MPP
1340-1379	MMP
1380-1419	MMM
1420-1459	DMM
1460-1499	DDM
1500-1529	DDD
1530-1559	D*DD
1560-1589	D*D*D
1590 and above	D*D*D*

Please refer to *Annexe G* for examples of calculation of qualification grade above pass grade.

Quality assurance of centres

Pearson's qualification specifications set out the standard to be achieved by each learner in order for them to gain the qualification. This is done throughout the learning outcomes, and assessment and grading criteria in each unit. Further guidance on delivery and assessment is given in the *Essential guidance for tutors* section in each unit. This section is designed to provide guidance related to the unit to support tutors, deliverers and assessors and to provide coherence of understanding and a consistency of delivery and assessment.

Approval

Centres that have not previously offered BTEC qualifications will first need to apply for, and be granted, centre approval before they can apply for approval to offer the programme.

When a centre applies for approval to offer a BTEC qualification they are required to enter into an approvals agreement.

The approvals agreement is a formal commitment by the head or principal of a centre to meet all the requirements of the specification and any linked codes or regulations. Sanctions and tariffs may be applied if centres do not comply with the agreement. Ultimately, this could result in the suspension of certification or withdrawal of approval.

Centres will be allowed 'accelerated approval' for a new programme where the centre already has approval for a programme that is being replaced by the new programme.

The key principles of quality assurance are that:

- a centre delivering BTEC programmes must be an approved centre and must have approval for programmes or groups of programmes that it is operating
- the centre agrees, as part of gaining approval, to abide by specific terms and conditions around the effective delivery and quality assurance of assessment; it must abide by these conditions throughout the period of delivery
- Pearson makes available to approved centres a range of materials and opportunities intended to exemplify the processes required for effective assessment and examples of effective standards. Approved centres must use the materials and services to ensure that all staff delivering BTEC qualifications keep up to date with the guidance on assessment
- an approved centre must follow agreed protocols for standardisation of assessors and verifiers; planning, monitoring and recording of assessment processes; and for dealing with special circumstances, appeals and malpractice.

The approach of quality assured assessment is made through a partnership between an approved centre and Pearson. Pearson is committed to ensuring that it follows best practice and employs appropriate technology to support quality assurance processes where practicable. Therefore, the specific arrangements for working with centres will vary. Pearson seeks to ensure that the quality assurance processes that it uses do not place undue bureaucratic processes on centres and works to support centres in providing robust quality assurance processes.

Pearson monitors and supports centres in the effective operation of assessment and quality assurance. The methods which it uses to do this for these BTEC programmes include:

- ensuring that all centres have completed appropriate declarations at the time of approval undertaking approval visits to centres where necessary

- requiring all centres to appoint a Lead Internal Verifier for designated groups of programmes and to ensure that this person is trained and supported in carrying out that role
- requiring that the Lead Internal Verifier completes compulsory online standardisation related to assessment and verification decisions for the designated programme
- assessment sampling and verification, through requested samples of assessments, completed assessed learner work and associated documentation
- overarching review and assessment of a centre's strategy for assessing and quality assuring its BTEC programmes.

Pearson Quality Assurance Handbook

Centres should refer to the *UK BTEC Quality Assurance Handbook*, issued annually, for detailed guidance.

An approved centre must make certification claims only when authorised by Pearson and strictly in accordance with requirements for reporting.

Centres that do not fully address and maintain rigorous approaches to quality assurance will be prevented from seeking certification for individual programmes or for all BTEC programmes. Centres that do not comply with remedial action plans may have their approval to deliver qualifications removed.

Programme design and delivery

The BTEC qualifications in this specification consist of mandatory units and optional units. Optional units are designed to provide a focus to the qualification and more specialist opportunities.

In BTEC qualifications each unit has a number of guided learning hours and centres are advised to take this into account when planning the programme of study associated with this specification.

Mode of delivery

Pearson does not define the mode of study for the BTEC qualifications in this specification. Centres are free to offer the qualifications using any mode of delivery (such as full time, part time, evening only, distance learning) that meets their learners' needs. Whichever mode of delivery is used, centres must ensure that learners have appropriate access to the resources identified in the specification and to the subject specialists delivering the units. This is particularly important for learners studying for the qualification through open or distance learning.

Learners studying for the qualification on a part-time basis bring with them a wealth of experience that should be utilised to maximum effect by tutors and assessors. The use of assessment evidence drawn from learners' work environments should be encouraged. Those planning the programme should aim to enhance the vocational nature of the qualification by:

- liaising with employers to ensure a course relevant to learners' specific needs
- accessing and using non-confidential data and documents from learners' workplaces

- including sponsoring employers in the delivery of the programme and, where appropriate, in the assessment
- linking with company-based/workplace training programmes
- making full use of the variety of experience of work and life that learners bring to the programme.

Resources

The BTEC qualifications in this specification are designed to prepare learners for employment in specific occupational sectors. Physical resources need to support the delivery of the programme and the proper assessment of the learning outcomes and should, therefore, normally be of industry standard. Staff delivering programmes and conducting the assessments should be familiar with current practice and standards in the sector concerned. Centres will need to meet any specific resource requirements to gain approval from Pearson.

Where specific resources are required these have been indicated in individual units in the *Essential resources* sections.

Delivery approach

It is important that centres develop an approach to teaching and learning that supports the specialist vocational nature of BTEC qualifications and the mode of delivery. Specifications give a balance of practical skill development and knowledge requirements, some of which can be theoretical in nature. Tutors and assessors need to ensure that appropriate links are made between theory and practical application and that the knowledge base is applied to the sector. This requires the development of relevant and up-to-date teaching materials that allow learners to apply their learning to actual events and activity within the sector. Maximum use should be made of the learner's experience.

An outline learning plan is included in every unit as guidance to demonstrate one way of planning the delivery and assessment of the unit. The outline learning plan can be used in conjunction with the programme of suggested assignments.

Where the qualification has been designated and approved as a Technical Certificate and forms part of an Apprenticeship scheme, particular care needs to be taken to build strong links between the learning and assessment for the BTEC qualification and the related NVQs and Functional Skills that also contribute to the scheme.

Meeting local needs

Centres should note that the qualifications set out in this specification have been developed in consultation with centres and employers and the Sector Skills Councils or the Standards Setting Bodies for the relevant sector. Centres should make maximum use of the choice available to them within the optional units to meet the needs of their learners, and local skills and training needs.

In certain circumstances, units in this specification might not allow centres to meet a local need. In this situation, Pearson will ensure that the rule of combination allows centres to make use of units from other specifications in this suite. Centres are required to ensure that the coherence and purpose of the qualification is retained and to ensure that the vocational focus is not diluted.

For information on limitations on variations from standard specifications see *Rules of combination for Pearson BTEC Level 3 qualifications in this specification*.

These units cannot be used at the expense of the mandatory units in any qualification.

Additional and specialist learning

Additional and specialist learning (ASL) consists of accredited qualifications. The ASL may include BTEC qualifications which are also available to learners not following a Diploma course of study.

Qualifications that are valid against different lines of principal learning can be identified on the Register of Regulated Qualifications.

Functional Skills

The BTEC qualifications in this specification give learners opportunities to develop and apply Functional Skills.

Functional Skills are offered as stand-alone qualifications at level 2. See individual units for opportunities to cover ICT, Mathematics and English Functional Skills.

Personal, learning and thinking skills

Opportunities are available to develop personal, learning and thinking skills (PLTS) within a sector-related context. PLTS are identified in brackets after the unit pass criteria to which they are associated and they are also mapped in *Annexe C*. Further opportunities for learners to demonstrate these skills may arise as learners progress throughout their learning.

Access and recruitment

Pearson's policy regarding access to its qualifications is that:

- they should be available to everyone who is capable of reaching the required standards
- they should be free from any barriers that restrict access and progression
- there should be equal opportunities for all wishing to access the qualifications.

Centres are required to recruit learners to BTEC qualifications with integrity. This will include ensuring that applicants have appropriate information and advice about the qualifications and that the qualification will meet their needs. Centres should take appropriate steps to assess each applicant's potential and make a professional judgement about their ability to successfully complete the programme of study and achieve the qualification. This assessment will need to take account of the support available to the learner within the centre during their programme of study and any specific support that might be necessary to allow the learner to access the assessment for the qualification. Centres should consult Edexcel's policy on learners with particular requirements.

Centres will need to review the entry profile of qualifications and/or experience held by applicants, considering whether this profile shows an ability to progress to a level 3 qualification. For learners who have recently been in education, the profile is likely to include one of the following:

- a BTEC Level 2 qualification in Engineering or a related vocational area
- a standard of literacy and numeracy supported by a general education equivalent to four GCSEs at grade A*-C
- other related level 2 qualifications
- related work experience.

More mature learners may present a more varied profile of achievement that is likely to include experience of paid and/or unpaid employment.

Restrictions on learner entry

Most BTEC qualifications are for learners aged 16 years and over.

In particular sectors the restrictions on learner entry might also relate to any physical or legal barriers, for example people working in health, care or education are likely to be subject to Criminal Records Bureau (CRB) checks.

The BTEC qualifications in this specification are listed on the DfE funding lists under Section 96 of the Learning and Skills Act 2000.

Access arrangements for learners with disabilities and specific needs

Equality and fairness are central to our work. Pearson's Equality Policy requires that all learners should have equal opportunity to access our qualifications and assessments, and that our qualifications should be awarded in a way that is fair to every learner.

We are committed to ensuring that:

- learners with a protected characteristic (as defined by the Equality Act 2010) are not, when they are undertaking one of our qualifications, disadvantaged in comparison to learners who do not share that characteristic
- all learners achieve the recognition they deserve from undertaking a qualification and that this achievement can be fairly compared to the achievement of their peers.

Details on how to make adjustments for learners with protected characteristics are given in the policy document *Reasonable Adjustment and Special Considerations for BTEC and Edexcel NVQ Qualifications*, which can be found on the Edexcel website.

Recognition of Prior Learning

Recognition of Prior Learning (RPL) is a method of assessment (leading to the award of credit) that considers whether a learner can demonstrate that they can meet the assessment requirements for a unit through knowledge, understanding or skills they already possess and so do not need to develop through a course of learning.

Pearson encourages centres to recognise learners' previous achievements and experiences whether at work, home and at leisure, as well as in the classroom. RPL provides a route for the recognition of the achievements resulting from continuous learning.

RPL enables recognition of achievement from a range of activities using any valid assessment methodology. Provided that the assessment requirements of a given unit or qualification have been met, the use of RPL is acceptable for accrediting a unit, units or a whole qualification. Evidence of learning must be valid and reliable.

Unit format

All units in BTEC qualifications have a standard format. The unit format is designed to give guidance on the requirements of the qualification for learners, tutors, assessors and those responsible for monitoring national standards.

Each unit has the following sections.

Unit title

The unit title will appear on the learner's Notification of Performance (NOP).

Level

All units and qualifications have a level assigned to them, which represents the level of achievement. There are nine levels of achievement, from Entry level to level 8. The level of the unit has been informed by the level descriptors and, where appropriate, the National Occupational Standards (NOS) and/or other sector/professional benchmarks.

Credit value

Each unit in BTEC qualifications has a credit value; learners will be awarded credits for the successful completion of whole units.

A credit value specifies the number of credits that will be awarded to a learner who has met all the learning outcomes of the unit.

Guided learning hours

Guided learning hours for the unit are defined on page 3.

Aim and purpose

The aim is a succinct statement that summarises the learning outcomes of the unit.

Unit introduction

The unit introduction gives the reader an appreciation of the unit in the vocational setting of the qualification, as well as highlighting the focus of the unit. It gives the reader a snapshot of the unit and the key knowledge, skills and understanding gained while studying the unit. The unit introduction also highlights any links to the appropriate vocational sector by describing how the unit relates to that sector.

Learning outcomes

Learning outcomes state exactly what a learner should 'know, understand or be able to do' as a result of completing the unit.

Unit content

The unit content identifies the breadth of knowledge, skills and understanding needed to design and deliver a programme of learning to achieve each of the learning outcomes. This is informed by the underpinning knowledge and understanding requirements of the related NOS. The content provides the range of subject material for the programme of learning and specifies the skills, knowledge and understanding required for achievement of the pass, merit and distinction grading criteria.

Each learning outcome is stated in full and then the key phrases or concepts related to that learning outcome are listed in italics followed by the subsequent range of related topics.

Relationship between content and assessment criteria

The learner must have the opportunity within the delivery of the unit to cover all of the unit content.

It is not a requirement of the unit specification that all of the content is assessed. However, the indicative content will need to be covered in a programme of learning in order for learners to be able to meet the standard determined in the assessment and grading criteria. The merit and distinction grading criteria enable the learner to achieve higher levels of performance in acquisition of knowledge, understanding and skills.

Content structure and terminology

The information below shows how unit content is structured and gives the terminology used to explain the different components within the content.

- Learning outcome: this is given and in bold at the beginning of each section of content.
- Italicised sub-heading: it contains a key phrase or concept. This is content which must be covered in the delivery of the unit. Colons mark the end of an italicised sub-heading.
- Elements of content: the elements are in plain text and amplify the sub-heading. The elements must also be covered in the delivery of the unit. Semi-colons mark the end of an element.
- Brackets contain amplification of elements of content which must be covered in the delivery of the unit.
- 'e.g.' is a list of examples used for indicative amplification of an element (that is, the content specified in this amplification that could be covered or that could be replaced by other, similar material).

Assessment and grading grid

Each grading grid gives the assessment and grading criteria used to determine the evidence that each learner must produce in order to receive a pass, merit or distinction grade. It is important to note that the merit and distinction grading criteria require a qualitative improvement in learner's evidence and not simply the production of more evidence at the same level.

Essential guidance for tutors

This section gives tutors additional guidance and amplification to aid understanding and a consistent level of delivery and assessment. It is divided into the following sections.

- *Delivery* – explains the content's relationship with the learning outcomes and offers guidance about possible approaches to delivery. This section is based on the more usual delivery modes but is not intended to rule out alternative approaches.
- *Outline learning plan* – the outline learning plan has been included in every unit as guidance and demonstrates one way in planning the delivery and assessment of a unit. The outline learning plan can be used in conjunction with the programme of suggested assignments.
- *Assessment* – gives amplification about the nature and type of evidence that learners need to produce in order to pass the unit or achieve the higher grades. This section should be read in conjunction with the grading criteria.
- *Suggested programme of assignments* – the table shows how the suggested assignments match and cover the assessment grading criteria.
- *Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications* – sets out links with other units within the qualification. These links can be used to ensure that learners make connections between units, resulting in a coherent programme of learning. The links show opportunities for integration of learning, delivery and assessment.
- *Essential resources* – identifies any specialist resources needed to allow learners to generate the evidence required for each unit. The centre will be asked to ensure that any requirements are in place when it seeks approval from Pearson to offer the qualification.
- *Employer engagement and vocational contexts* – provides a short list of agencies, networks and other useful contacts for employer engagement and for sources of vocational contexts.
- *Indicative reading for learners* – gives a list of resource materials for learners that benchmark the level of study.

Further information

For further information please call Customer Services on 020 7010 2188 (calls may be recorded for quality and training purposes) or email teachingPEandSport@pearson.com.

Useful publications

Further copies of this document and related publications can be obtained from:

Telephone: 0845 172 0205

Email: publication.orders@edexcel.com

Related information and publications include:

- Functional Skills publications – specifications, tutor support materials and question papers
- the current Pearson publications catalogue and update catalogue.

Pearson publications concerning the Quality Assurance System and the internal and external verification of vocationally related programmes can be found on the Pearson website and in the Pearson publications catalogue.

NB: Most of our publications are priced. There is also a charge for postage and packing. Please check the cost when you order.

How to obtain National Occupational Standards

Please contact:

SEMTA
14 Upton Road
Watford
WD18 0JT

Telephone: 01923 238441

Website: www.semta.org.uk

Professional development and training

Pearson supports UK and international customers with training related to BTEC qualifications. This support is available through a choice of training options offered in our published training directory or through customised training at your centre.

The support we offer focuses on a range of issues including:

- planning for the delivery of a new programme
- planning for assessment and grading
- developing effective assignments
- building your team and teamwork skills
- developing student-centred learning and teaching approaches
- building Functional Skills into your programme
- building in effective and efficient quality assurance systems.

The national programme of training we offer can be viewed on our website (www.edexcel.com/training). You can request customised training through the website or by contacting one of our advisers in the Training from Pearson UK to discuss your training needs.

The training we provide:

- is active – ideas are developed and applied
- is designed to be supportive and thought provoking
- builds on best practice.

Annexe A

The Pearson BTEC qualification framework for the Engineering sector

Progression opportunities within the framework.

Level	General qualifications	BTEC full vocationally-related qualifications	BTEC Short Courses	NVQ/occupational
8				
7				
6				
5		HND in Manufacturing Engineering HND in Mechanical Engineering HND in Operations Engineering HND in Electrical/Electronic Engineering		
4		HNC in Manufacturing Engineering HNC in Mechanical Engineering HNC in Operations Engineering HNC in Electrical/Electronic Engineering		

Level	General qualifications	BTEC full vocationally-related qualifications	BTEC Short Courses	NVQ/occupational
3		Pearson BTEC Level 3 Diploma and Extended Diploma in Mechanical Engineering Pearson BTEC Level 3 Diploma and Extended Diploma in Manufacturing Engineering Pearson BTEC Level 3 Diploma and Extended Diploma in Operations and Maintenance Engineering Pearson BTEC Level 3 Diploma and Extended Diploma in Electrical/Electronic Engineering Pearson BTEC Level 3 Diploma and Extended Diploma in Aeronautical Engineering		
	GCSE Engineering GCSE Manufacturing	Pearson BTEC Level 2 Certificate, Extended Certificate and Diploma in Engineering		Level 2 NVQ in Performing Engineering Operations Level 2 NVQ in Performing Manufacturing Operations Level 2 NVQ in Business Improvement Techniques
1		Introductory Certificate and Diploma in Engineering		Level 1 NVQ in Performing Engineering Operations Level 1 NVQ in Performing Manufacturing Operations
Entry				

Annexe B

Grading domains: BTEC level 3 generic grading domains

Grading domain 1	Indicative characteristics – merit	Indicative characteristics – distinction
Application of knowledge and understanding (Learning outcome stem <i>understand</i> or <i>know</i>)	- Shows depth of knowledge and development of understanding in familiar and unfamiliar situations (for example explain why, makes judgements based on analysis). - Applies and/or selects concepts showing comprehension of often complex theories. - Applies knowledge in often familiar and unfamiliar contexts. - Applies knowledge to non-routine contexts (eg assessor selection). - Makes reasoned analytical judgements. - Shows relationships between pass criteria.	- Synthesises knowledge and understanding across pass and merit criteria. - Evaluates complex concepts/ideas/actions and makes reasoned and confident judgements. - Uses analysis, research and evaluation to make recommendations and influence proposals. - Analyses implications of application of knowledge/understanding. - Accesses and evaluates knowledge and understanding to advance complex activities/contextes. - Shows relationships with pass and merit criteria. - Responds positively to evaluation.
Grading domain 2	Indicative characteristics – merit	Indicative characteristics – distinction
Development of practical and technical skills (Learning outcome stem <i>be able to</i>)	- Deploys appropriate advanced techniques/processes/skills. - Applies technical skill to advance non-routine activities. - Advances practical activities within resource constraints. - Produces varied solutions (including non-routine). - Modifies techniques/processes to situations. - Shows relationship between pass criteria.	- Demonstrates creativity/originality/own ideas. - Applies skill(s) to achieve higher order outcome. - Selects and uses successfully from a range of advanced techniques/processes/skills. - Reflects on skill acquisition and application. - Justifies application of skills/methods. - Makes judgements about risks and limitations of techniques/processes. - Innovates or generates new techniques/processes for new situations. - Shows relationship with pass and merit criteria.

Grading domain 3	Indicative characteristics – merit	Indicative characteristics – distinction
Personal development for occupational roles (Any learning outcome stem)	• Takes responsibility in planning and undertaking activities. • Reviews own development needs. • Finds and uses relevant information sources. • Acts within a given work-related context showing understanding of responsibilities. • Identifies responsibilities of employers to the community and the environment. • Applies qualities related to the vocational sector. • Internalises skills/attributes (creating confidence).	• Manages self to achieve outcomes successfully. • Plans for own learning and development through the activities. • Analyses and manipulates information to draw conclusions. • Applies initiative appropriately. • Assesses how different work-related contexts or constraints would change performance. • Reacts positively to changing work-related contexts • Operates ethically in work-related environments. • Takes decisions related to work contexts. • Applies divergent and lateral thinking in work-related contexts. • Understands interdependence.
Grading domain 4	Indicative characteristics – merit	Indicative characteristics – distinction
Application of generic skills (Any learning outcome stem)	• Communicates effectively using appropriate behavioural and language registers. • Communicates with clarity and influence. • Makes judgements in contexts with explanations. • Explains how to contribute within a team. • Demonstrates positive contribution to team(s). • Makes adjustments to meet the needs/expectations of others (negotiation skills). • Selects and justifies solutions for specified problems.	• Presents self and communicates information to meet the needs of a variety of audience. • Identifies strategies for communication. • Shows innovative approaches to dealing with individuals and groups. • Takes decisions in contexts with justifications. • Produces outputs subject to time/resource constraints. • Reflects on own contribution to working within a team. • Generates new or alternative solutions to specified problems. • Explores entrepreneurial attributes.

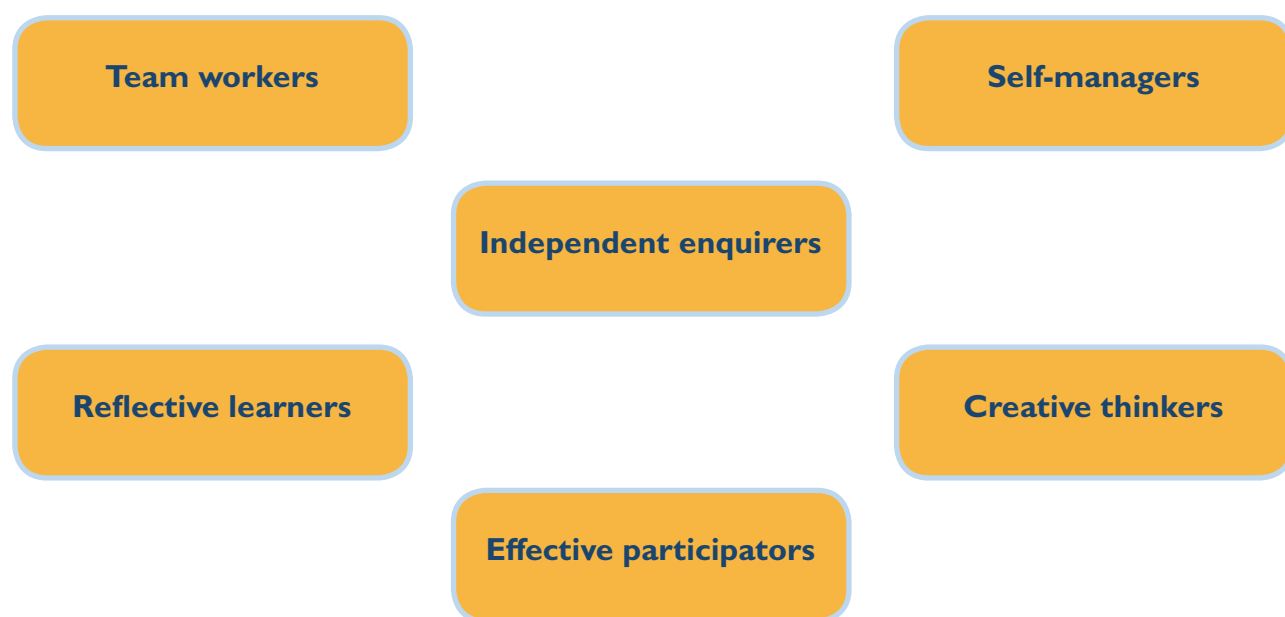
Annexe C

Personal, learning and thinking skills

A FRAMEWORK OF PERSONAL, LEARNING AND THINKING SKILLS 11–19 IN ENGLAND

The framework comprises six groups of skills that, together with the Functional Skills of English, Mathematics and ICT, are essential to success in learning, life and work. In essence the framework captures the essential skills of: managing self; managing relationships with others; and managing own learning, performance and work. It is these skills that will enable young people to enter work and adult life confident and capable.

The titles of the six groups of skills are set out below.



For each group there is a focus statement that sums up the range of skills. This is followed by a set of outcome statements that are indicative of the skills, behaviours and personal qualities associated with each group.

Each group is distinctive and coherent. The groups are also inter-connected. Young people are likely to encounter skills from several groups in any one learning experience. For example an independent enquirer would set goals for their research with clear success criteria (reflective learner) and organise and manage their time and resources effectively to achieve these (self-manager). In order to acquire and develop fundamental concepts such as organising oneself, managing change, taking responsibility and perseverance, learners will need to apply skills from all six groups in a wide range of learning contexts 11–19.

The Skills

Independent enquirers

Focus:

Young people process and evaluate information in their investigations, planning what to do and how to go about it. They take informed and well-reasoned decisions, recognising that others have different beliefs and attitudes.

Young people:

- identify questions to answer and problems to resolve
- plan and carry out research, appreciating the consequences of decisions
- explore issues, events or problems from different perspectives
- analyse and evaluate information, judging its relevance and value
- consider the influence of circumstances, beliefs and feelings on decisions and events
- support conclusions, using reasoned arguments and evidence.

Creative thinkers

Focus:

Young people think creatively by generating and exploring ideas, making original connections. They try different ways to tackle a problem, working with others to find imaginative solutions and outcomes that are of value.

Young people:

- generate ideas and explore possibilities
- ask questions to extend their thinking
- connect their own and others' ideas and experiences in inventive ways
- question their own and others' assumptions
- try out alternatives or new solutions and follow ideas through
- adapt ideas as circumstances change.

Reflective learners

Focus:

Young people evaluate their strengths and limitations, setting themselves realistic goals with criteria for success. They monitor their own performance and progress, inviting feedback from others and making changes to further their learning.

Young people:

- assess themselves and others, identifying opportunities and achievements
- set goals with success criteria for their development and work
- review progress, acting on the outcomes
- invite feedback and deal positively with praise, setbacks and criticism
- evaluate experiences and learning to inform future progress
- communicate their learning in relevant ways for different audiences.

Team workers

Focus:

Young people work confidently with others, adapting to different contexts and taking responsibility for their own part. They listen to and take account of different views. They form collaborative relationships, resolving issues to reach agreed outcomes.

Young people:

- collaborate with others to work towards common goals
- reach agreements, managing discussions to achieve results
- adapt behaviour to suit different roles and situations, including leadership role
- show fairness and consideration to others
- take responsibility, showing confidence in themselves and their contribution
- provide constructive support and feedback to others.

Self-managers

Focus:

Young people organise themselves, showing personal responsibility, initiative, creativity and enterprise with a commitment to learning and self-improvement. They actively embrace change, responding positively to new priorities, coping with challenges and looking for opportunities.

Young people:

- seek out challenges or new responsibilities and show flexibility when priorities change
- work towards goals, showing initiative, commitment and perseverance
- organise time and resources, prioritising actions
- anticipate, take and manage risks
- deal with competing pressures, including personal and work-related demands
- respond positively to change, seeking advice and support when needed
- manage their emotions, and build and maintain relationships.

Effective participators

Focus:

Young people actively engage with issues that affect them and those around them. They play a full part in the life of their school, college, workplace or wider community by taking responsible action to bring improvements for others as well as themselves.

Young people:

- discuss issues of concern, seeking resolution where needed
- present a persuasive case for action
- propose practical ways forward, breaking these down into manageable steps
- identify improvements that would benefit others as well as themselves
- try to influence others, negotiating and balancing diverse views to reach workable solutions
- act as an advocate for views and beliefs that may differ from their own.

PLTS performance indicator (suggested recording sheet)

Name:	Date:				
	Level of success 1 = low, 5 = high				
Independent enquirers					
Identify questions to answer and problems to resolve	1	2	3	4	5
Plan and carry out research, appreciating the consequences of decisions	1	2	3	4	5
Explore issues, events or problems from different perspectives	1	2	3	4	5
Analyse and evaluate information, judging its relevance and value	1	2	3	4	5
Consider the influence of circumstances, beliefs and feelings on decisions and events	1	2	3	4	5
Support conclusions, using reasoned arguments and evidence	1	2	3	4	5
Creative thinkers					
Generate ideas and explore possibilities	1	2	3	4	5
Ask questions to extend their thinking	1	2	3	4	5
Connect their own and others' ideas and experiences in inventive ways	1	2	3	4	5
Question their own and others' assumptions	1	2	3	4	5
Try out alternatives or new solutions and follow ideas through	1	2	3	4	5
Adapt ideas as circumstances change	1	2	3	4	5
Reflective learners					
Assess themselves and others, identifying opportunities and achievements	1	2	3	4	5
Set goals with success criteria for their development and work	1	2	3	4	5
Review progress, acting on the outcomes	1	2	3	4	5
Invite feedback and deal positively with praise, setbacks and criticism	1	2	3	4	5
Evaluate experiences and learning to inform future progress	1	2	3	4	5
Communicate their learning in relevant ways for different audiences	1	2	3	4	5

Team workers					
Collaborate with others to work towards common goals	1	2	3	4	5
Reach agreements, managing discussions to achieve results	1	2	3	4	5
Adapt behaviour to suit different roles and situations, including leadership roles	1	2	3	4	5
Show fairness and consideration to others	1	2	3	4	5
Take responsibility, showing confidence in themselves and their contribution	1	2	3	4	5
Provide constructive support and feedback to others	1	2	3	4	5
Self-managers					
Seek out challenges or new responsibilities and show flexibility when priorities change	1	2	3	4	5
Work towards goals, showing initiative, commitment and perseverance	1	2	3	4	5
Organise time and resources, prioritising actions	1	2	3	4	5
Anticipate, take and manage risks	1	2	3	4	5
Deal with competing pressures, including personal and work-related demands	1	2	3	4	5
Respond positively to change, seeking advice and support when needed	1	2	3	4	5
Manage their emotions, and build and maintain relationships.	1	2	3	4	5
Effective participators					
Discuss issues of concern, seeking resolution where needed	1	2	3	4	5
Present a persuasive case for action	1	2	3	4	5
Propose practical ways forward, breaking these down into manageable steps	1	2	3	4	5
Identify improvements that would benefit others as well as themselves	1	2	3	4	5
Try to influence others, negotiating and balancing diverse views to reach workable solutions	1	2	3	4	5
Act as an advocate for views and beliefs that may differ from their own	1	2	3	4	5

Note to learner: The circled number represents an indication of your PLTS performance so far.

Note to tutor: Indicate the level of success by circling the appropriate number during your feedback with the learner.

Summary of the PLTS coverage throughout the programme

Personal, learning and thinking skills	Unit									
	1	2	3	4	5	6	8	9	10	11
Independent enquirers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Creative thinkers	✓	✓	✓				✓			
Reflective learners			✓							
Team workers			✓							
Self-managers	✓		✓			✓				
Effective participators	✓		✓							
✓ – opportunities for development										

Personal, learning and thinking skills	Unit									
	12	13	14	15	16	17	18	19	20	21
Independent enquirers	✓	✓	✓	✓	✓	✓	✓	✓		✓
Creative thinkers					✓	✓		✓		
Reflective learners										
Team workers										
Self-managers						✓		✓		
Effective participators									✓	
✓ – opportunities for development										

Personal, learning and thinking skills	Unit									
	22	23	25	26	27	28	34	35	51	52
Independent enquirers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Creative thinkers						✓	✓	✓		
Reflective learners										
Team workers										
Self-managers	✓	✓		✓	✓		✓	✓		
Effective participators										
✓ – opportunities for development										

Personal, learning and thinking skills	Unit						
	53	57	58	60	61	62	63
Independent enquirers	✓	✓	✓	✓	✓	✓	✓
Creative thinkers		✓		✓			
Reflective learners							
Team workers							
Self-managers	✓	✓	✓	✓	✓	✓	
Effective participators							
✓ – opportunities for development							

Annexe D

Wider curriculum mapping

The BTEC qualifications in this specification give learners opportunities to develop an understanding of spiritual, moral, ethical, social and cultural issues, as well as an awareness of citizenship, environmental issues, European developments, health and safety considerations and equal opportunities issues.

The BTEC qualifications in this specification make a positive contribution to wider curricular areas as appropriate.

Spiritual, moral, ethical, social and cultural issues

These qualifications contribute to an understanding of moral and ethical issues, for example when learners are dealing with colleagues and customers.

Citizenship issues

Learners undertaking the BTEC qualifications in this specification will have the opportunity to develop their understanding of citizenship issues, for example in terms of their rights and responsibilities in the engineering workplace.

Environmental issues

Learners undertaking the BTEC qualifications in this specification will have the opportunity to develop their understanding of environmental issues, for example by considering the influence that engineering processes can have on the environment, and the ways that this impact can be reduced.

European developments

Much of the content of the BTEC qualifications in this specification applies throughout Europe even though delivery is in a UK context.

Health and safety considerations

The BTEC qualifications in this specification are practically based and health and safety issues are encountered throughout the units.

Equal opportunities issues

Equal opportunities issues are implicit throughout the BTEC qualifications in this specification .

Wider curriculum mapping

Level 3

	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 8	Unit 9	Unit 10
Spiritual									
Moral and ethical	✓	✓						✓	
Social and cultural	✓	✓						✓	
Citizenship issues	✓	✓						✓	
Environmental issues	✓		✓					✓	
European developments	✓		✓				✓	✓	✓
Health and safety considerations	✓		✓					✓	
Equal opportunities issues	✓	✓	✓	✓	✓	✓	✓	✓	✓

	Unit 11	Unit 12	Unit 13	Unit 14	Unit 15	Unit 16	Unit 17	Unit 18	Unit 19
Spiritual									
Moral and ethical									
Social and cultural									
Citizenship issues									
Environmental issues					✓			✓	
European developments					✓	✓	✓		✓
Health and safety considerations					✓			✓	
Equal opportunities issues	✓	✓	✓	✓	✓	✓	✓	✓	✓

	Unit 20	Unit 21	Unit 22	Unit 23	Unit 25	Unit 26	Unit 27	Unit 28	Unit 34	Unit 35
Spiritual										
Moral and ethical										
Social and cultural										
Citizenship issues										
Environmental issues	✓	✓		✓			✓			
European developments				✓	✓		✓			
Health and safety considerations	✓	✓	✓	✓	✓		✓		✓	✓
Equal opportunities issues	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

	Unit 51	Unit 52	Unit 53	Unit 57	Unit 58	Unit 60	Unit 61	Unit 62	Unit 63	
Spiritual										
Moral and ethical										
Social and cultural										
Citizenship issues										
Environmental issues										
European developments			✓							
Health and safety considerations	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Equal opportunities issues	✓	✓	✓	✓	✓	✓	✓	✓	✓	



Annexe E

National Occupational Standards/mapping with NVQs

The grid on the next page maps the knowledge covered in the Pearson BTEC Level 3 Certificate, Subsidiary Diploma, 90-credit Diploma, Diploma and Extended Diploma in Engineering against the underpinning knowledge of the Level 3 NVQ in Electrical and Electronic Engineering, Level 3 NVQ in Mechanical Manufacturing Engineering, Level 3 NVQ in Business Improvement Techniques, Level 3 NVQ in Engineering Leadership, Level 3 NVQ in Engineering Maintenance, Level 3 NVQ in Project Management, Level 3 NVQ in Engineering Technical Support, Level 3 NVQ in Fabrication and Welding and Level 3 NVQ in Installation and Commissioning SEMTA SSC National Occupational Standards.

KEY

Relevant NVQ units are listed where the BTEC unit provides partial coverage of the underpinning knowledge and understanding.

A blank space indicates no coverage of the underpinning knowledge.

NVQs	Units								
	1	2	3	4	5	6	8	9	10
Level 3 NVQ in Mechanical Manufacturing Engineering	Unit 1	Unit 2							
Level 3 NVQ in Business Improvement Techniques	Unit 1	Unit 2							
Level 3 NVQ in Engineering Leadership	Unit 1		Units 4, 5, 7						
Level 3 NVQ in Engineering Maintenance		Unit 2							
Level 3 NVQ in Project Management			Units 4, 10, 11, 15, 17						
Level 3 NVQ in Electrical and Electronic Engineering						Units 15, 17, 18, 24, 25, 26, 27, 28, 30, 31, 32, 33			
Level 3 NVQ in Engineering Technical Support							Units 2, 47, 58		

NVQs	Units									
	11	12	13	14	15	16	17	18	19	20
Level 3 NVQ in Engineering Maintenance			Units 19, 20							
Level 3 NVQ in Engineering Technical Support						Units 2, 4, 6, 7, 9	Units 4, 5, 6, 7, 8, 9, 10	Units 11, 17		
Level 3 NVQ in Installation and Commissioning					Units 6, 9					
Level 3 NVQ in Materials Processing and Finishing										Units 4, 5, 6, 7, 8, 9, 22, 24, 50, 51, 52, 53, 54, 60, 61

NVQs	Units							
	21	22	23	25	26	27	28	34
Level 3 NVQ in Mechanical Manufacturing Engineering	Units 5, 7, 9, 17, 19, 21, 23, 25				Units 30, 31, 32, 33, 34, 35, 36, 37			
Level 3 NVQ in Engineering Maintenance								
Level 3 NVQ in Engineering Technical Support				Units 30, 32	Units 30, 36, 37, 38, 42			
Level 3 NVQ in Installation and Commissioning								
Level 3 NVQ in Materials Processing and Finishing	Units 29, 30, 31, 32, 33, 34, 35, 36, 37, 40, 41, 42, 44, 45							
Level 3 NVQ in Fabrication and Welding		Units 22, 23, 24, 25, 27, 28, 29, 30, 32, 33, 34, 35, 36, 37, 38	Units 4, 5, 6, 7, 16, 17, 18, 20, 65					
Level 3 NVQ in Electrical and Electronic Engineering								Units 4, 10, 11, 12, 13

NVQs	Units									
	35	51	52	53	57	58	60	61	62	63
Level 3 NVQ in Electrical and Electronic Engineering	Units 10, 12, 18				Units 15, 16, 17, 18	Units 15, 16, 17, 18			Units 1, 34	Units 26, 27, 28, 29, 30
Level 3 NVQ in Electrical and Electronic Servicing			Unit 12							
Level 3 NVQ in Engineering Maintenance				Units 17, 40			Units 17, 40			



Annexe F

Unit mapping overview

NQF BTEC National in Engineering (specification end date 31/08/2010)/new versions of the BTEC qualifications in Engineering (specification start date 01/09/2010) – the BTEC Level 3 Certificate in Engineering, BTEC Level 3 Subsidiary Diploma in Engineering, BTEC Level 3 90-credit Diploma in Engineering, BTEC Level 3 Diploma in Engineering and the BTEC Level 3 Extended Diploma in Engineering.

Old units \ New units	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 8	Unit 9	Unit 10	Unit 11
Unit 1										
Unit 2		F								
Unit 3			F							
Unit 4				F						
Unit 5						F				
Unit 6					F					
Unit 7	F									
Unit 8							F			
Unit 9								F		
Unit 10									F	
Unit 11										F

Old units \ New units	Unit 12	Unit 13	Unit 14	Unit 15	Unit 16	Unit 17	Unit 18	Unit 19	Unit 20	Unit 21
Unit 12	F									
Unit 13		F								
Unit 14			F							
Unit 15				F						
Unit 16					F					
Unit 17						F				
Unit 18							F			
Unit 19								F		
Unit 20									F	
Unit 21										F

Old units \ New units	Unit 22	Unit 23	Unit 24	Unit 25	Unit 26	Unit 27	Unit 28	Unit 34	Unit 35	Unit 52
Unit 22	F									
Unit 23		F								
Unit 24			F							
Unit 25				F						
Unit 26					F					
Unit 27						F				
Unit 28							F			
Unit 34								F		
Unit 35									F	
Unit 51										F

Old units \ New units	Unit 53	Unit 54	Unit 60	Unit 61	Unit 63	Unit 64	Unit 65	Unit 66		
Unit 52	F									
Unit 53		F								
Unit 57			F							
Unit 58				F						
Unit 60					F					
Unit 61						F				
Unit 62							F			
Unit 63								F		

KEY

P – Partial mapping (some topics from the old unit appear in the new unit)

F – Full mapping (topics in old unit match new unit exactly or almost exactly)

X – Full mapping + new (all the topics from the old unit appear in the new unit, but new unit also contains new topic(s))

Unit mapping in depth

BTEC National in Engineering (specification end date 31/08/2010)/new versions of the BTEC qualifications in Engineering (specification start date 01/09/2010) – the BTEC Level 3 Certificate in Engineering, BTEC Level 3 Subsidiary Diploma in Engineering, BTEC Level 3 90-credit Diploma in Engineering, BTEC Level 3 Diploma in Engineering and the BTEC Level 3 Extended Diploma in Engineering.

New units		Old units		Mapping/ comments (new topics in italics)
Number	Name	Number	Name	
Unit 1	Health and Safety in the Engineering Workplace	Unit 7	Health, Safety, Risk Assessment and Welfare in the Engineering Workplace	Full coverage
Unit 2	Communications for Engineering Technicians	Unit 2	Communications for Technicians	Full coverage
Unit 3	Engineering Project	Unit 3	Engineering Project	Full coverage
Unit 4	Mathematics for Engineering Technicians	Unit 4	Mathematics for Technicians	Full coverage
Unit 5	Mechanical Principles and Applications	Unit 5	Electrical and Electronic Principles	Full coverage
Unit 6	Electrical and Electronic Principles	Unit 6	Mechanical Principles and Applications	Full coverage
Unit 8	Engineering Design	Unit 8	Engineering Design	Full coverage
Unit 9	Commercial Aspects of Engineering Organisations	Unit 9	Commercial Aspects of Organisations Employing Engineers	Full coverage
Unit 10	Properties and Applications of Engineering Materials	Unit 10	Properties and Applications of Engineering Materials	Full coverage
Unit 11	Further Mechanical Principles and Applications	Unit 11	Further Mechanical Principles and Applications	Full coverage
Unit 12	Applications of Mechanical Systems in Engineering	Unit 12	Applications of Mechanical Systems in Engineering	Full coverage
Unit 13	Principles and Applications of Fluid Mechanics	Unit 13	Principles and Applications of Fluid Mechanics	Full coverage
Unit 14	Principles and Applications of Thermodynamics	Unit 14	Principles and Applications of Thermodynamics	Full coverage
Unit 15	Electro, Pneumatic and Hydraulic Systems and Devices	Unit 15	Electro, Pneumatic and Hydraulic Systems and Devices	Full coverage
Unit 16	Engineering Drawing for Technicians	Unit 16	Engineering Drawing for Technicians	Full coverage
Unit 17	Computer Aided Drafting in Engineering	Unit 17	Computer Aided Drafting	Full coverage
Unit 18	Advanced Mechanical Principles and Applications	Unit 18	Advanced Mechanical Principles and Applications	Full coverage
Unit 19	Mechanical Measurement and Inspection Techniques	Unit 19	Mechanical Measurement and Inspection Techniques	Full coverage
Unit 20	Engineering Primary Forming Processes	Unit 20	Engineering Primary Forming Processes	Full coverage

New units		Old units		Mapping/ comments (new topics in <i>italics</i>)
Number	Name	Number	Name	
Unit 21	Engineering Secondary and Finishing Techniques	Unit 21	Engineering Secondary/Finishing Processes	Full coverage
Unit 22	Fabrication Processes and Technology	Unit 22	Fabrication Processes and Technology	Full coverage
Unit 23	Welding Technology	Unit 23	Applications of Welding Technology	Full coverage
Unit 25	Selecting and Using Programmable Logic Controllers	Unit 25	Selection and Applications of Programmable Logic Controllers	Full coverage
Unit 26	Applications of Computer Numerical Control in Engineering	Unit 26	Computer Numerical Control of Machine Tools	Full coverage
Unit 27	Welding Principles	Unit 27	Welding Principles	Full coverage
Unit 28	Further Mathematics Engineering for Technicians	Unit 28	Further Mathematics for Technicians	Full coverage
Unit 34	Electronic Circuit Design and Manufacture	Unit 34	Electronic Circuit Manufacture	Full coverage
Unit 35	Principles and Applications of Electronic Devices and Circuits	Unit 35	Principles and Applications of Electronic Devices and Circuits	Full coverage
Unit 51	Electrical Technology	Unit 52	Electrical Technology	Full coverage
Unit 52	Electrical Installation	Unit 53	Electrical Installation	Full coverage
Unit 53	Electronic Measurement and Testing	Unit 54	Electronic Measurement and Testing	Full coverage
Unit 57	Principles and Applications of Analogue Electronics	Unit 60	Principles and Applications of Analogue Electronics	Full coverage
Unit 58	Construction and Application of Digital Systems	Unit 61	Construction and Application of Digital Systems	Full coverage
Unit 60	Electronic Fault-Finding	Unit 63	Electronic Fault-Finding	Full coverage
Unit 61	Features and Applications of Electrical Machines	Unit 64	Electrical Applications	Full coverage
Unit 62	Principles and Operation of Three-Phase Systems	Unit 65	Three-Phase Systems	Full coverage
Unit 63	Three-Phase Motors and Drives	Unit 66	Three-Phase Motors and Drives	Full coverage

Annexe G

Examples of calculation of qualification grade above pass grade

Pearson will automatically calculate the qualification grade for learners when unit grades are submitted. The generic examples below demonstrate how the qualification grade above pass is calculated.

Points available for credits achieved at different levels and unit grades

The table below shows the **number of points scored per credit** at the unit level and grade.

Unit level	Points per credit		
	Pass	Merit	Distinction
Level 2	5	6	7
Level 3	7	8	9
Level 4	9	10	11

Learners who achieve the correct number of points within the ranges shown in the 'qualification grade' table below will achieve the qualification merit, distinction or distinction* grades (or combinations of these grades appropriate to the qualification).

Qualification grade

BTEC Level 3 Certificate

Points range above pass grade	Grade	
230-249	Merit	M
250-259	Distinction	D
260 and above	Distinction*	D*

BTEC Level 3 Subsidiary Diploma

Points range above pass grade	Grade	
460-499	Merit	M
500-519	Distinction	D
520 and above	Distinction*	D*

BTEC Level 3 90-credit Diploma

Points range above pass grade	Grade
660-689	MP
690-719	MM
720-749	DM
750-769	DD
770-789	D*D
790 and above	D*D*

BTEC Level 3 Diploma

Points range above pass grade	Grade
880-919	MP
920-959	MM
960-999	DM
1000-1029	DD
1030-1059	D*D
1060 and above	D*D*

BTEC Level 3 Extended Diploma

Points range above pass grade	Grade
1300-1339	MPP
1340-1379	MMP
1380-1419	MMM
1420-1459	DMM
1460-1499	DDM
1500-1529	DDD
1530-1559	D*DD
1560-1589	D*D*D
1590 and above	D*D*D*

Example 1

Achievement of pass qualification grade

A learner completing a 30-credit BTEC Level 3 Certificate **does not** achieve the points required to gain a merit qualification grade.

	Level	Credit	Grade	Grade points	Points per unit = credit x grade
Unit 1	3	10	Pass	7	$10 \times 7 = 70$
Unit 2	3	10	Pass	7	$10 \times 7 = 70$
Unit 3	3	10	Merit	8	$10 \times 8 = 80$
Qualification grade totals		30	Pass		220

Example 2

Achievement of merit qualification grade

A learner completing a 30-credit BTEC Level 3 Certificate achieves the points required to gain a merit qualification grade.

	Level	Credit	Grade	Grade points	Points per unit = credit x grade
Unit 1	3	10	Pass	7	$10 \times 7 = 70$
Unit 2	3	10	Merit	8	$10 \times 8 = 80$
Unit 3	3	10	Merit	8	$10 \times 8 = 80$
Qualification grade totals			Merit		230

Example 3

Achievement of distinction qualification grade

A learner completing a 60-credit BTEC Level 3 Subsidiary Diploma achieves the points required to gain a distinction qualification grade.

	Level	Credit	Grade	Grade points	Points per unit = credit x grade
Unit 1	3	10	Merit	8	$10 \times 8 = 80$
Unit 2	3	10	Distinction	9	$10 \times 9 = 90$
Unit 3	3	10	Distinction	9	$10 \times 9 = 90$
Unit 5	3	10	Merit	8	$10 \times 8 = 80$
Unit 6	2	10	Distinction	7	$10 \times 7 = 70$
Unit 11	3	10	Distinction	9	$10 \times 9 = 90$
Qualification grade totals		60	Distinction		500

Example 4

Achievement of distinction distinction grade

A learner completing a BTEC Level 3 90-credit Diploma achieves the points required to gain a distinction distinction qualification grade.

	Level	Credit	Grade	Grade points	Points per unit = credit x grade
Unit 1	3	10	Merit	8	$10 \times 8 = 80$
Unit 2	3	10	Distinction	9	$10 \times 9 = 90$
Unit 3	3	10	Distinction	9	$10 \times 9 = 90$
Unit 4	3	10	Merit	8	$10 \times 8 = 80$
Unit 5	3	10	Merit	8	$10 \times 8 = 80$
Unit 6	2	10	Distinction	7	$10 \times 7 = 70$
Unit 11	3	10	Distinction	9	$10 \times 9 = 90$
Unit 15	4	10	Merit	10	$10 \times 10 = 100$
Unit 17	3	10	Pass	7	$10 \times 7 = 70$
Qualification grade totals		90	Distinction Distinction		750

Example 5

Achievement of distinction merit qualification grade

A learner completing a 120-credit BTEC Level 3 Diploma achieves the points required to gain a distinction merit qualification grade.

	Level	Credit	Grade	Grade points	Points per unit = credit x grade
Unit 1	3	10	Merit	8	$10 \times 8 = 80$
Unit 2	3	10	Distinction	9	$10 \times 9 = 90$
Unit 3	3	10	Distinction	9	$10 \times 9 = 90$
Unit 4	3	10	Merit	8	$10 \times 8 = 80$
Unit 5	3	10	Merit	8	$10 \times 8 = 80$
Unit 6	2	10	Distinction	7	$10 \times 7 = 70$
Unit 11	3	10	Distinction	9	$10 \times 9 = 90$
Unit 15	4	10	Merit	10	$10 \times 10 = 100$
Unit 17	3	10	Pass	7	$10 \times 7 = 70$
Unit 18	3	10	Pass	7	$10 \times 7 = 70$
Unit 25	3	20	Merit	8	$20 \times 8 = 160$
Qualification grade totals		120	Distinction Merit		980

Example 6

Achievement of merit merit merit qualification grade

A learner completing a 180-credit BTEC Level 3 Extended Diploma achieves the points required to gain a merit merit merit qualification grade.

	Level	Credit	Grade	Grade points	Points per unit = credit x grade
Unit 1	3	10	Merit	8	$10 \times 8 = 80$
Unit 2	3	10	Pass	7	$10 \times 7 = 70$
Unit 3	3	10	Distinction	9	$10 \times 9 = 90$
Unit 4	3	10	Merit	8	$10 \times 8 = 80$
Unit 5	3	10	Pass	7	$10 \times 7 = 70$
Unit 6	2	10	Distinction	7	$10 \times 7 = 70$
Unit 11	3	10	Distinction	9	$10 \times 9 = 90$
Unit 12	3	10	Merit	8	$10 \times 8 = 80$
Unit 15	4	10	Pass	9	$10 \times 9 = 90$
Unit 17	3	10	Pass	7	$10 \times 7 = 70$
Unit 18	3	10	Pass	7	$10 \times 7 = 70$
Unit 20	3	10	Pass	7	$10 \times 7 = 70$
Unit 22	3	10	Merit	8	$10 \times 8 = 80$
Unit 25	3	20	Pass	7	$20 \times 7 = 140$
Unit 35	3	10	Distinction	9	$10 \times 9 = 90$
Unit 36	3	10	Merit	8	$10 \times 8 = 80$
Unit 38	3	10	Distinction	9	$10 \times 9 = 90$
Qualification grade totals		180	Merit Merit Merit		1410

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