

BTEC

Edexcel Level 3 BTEC Nationals in Engineering

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Specification

Edexcel Level 3 BTEC Nationals in
Engineering



Qualifications and
Curriculum Authority



Llywodraeth Cynulliad Cymru
Welsh Assembly Government



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Ten principles for delivering an Edexcel Level 3 BTEC National qualification

This specification contains the rules and regulations, along with the units and associated guidance, to enable centres to design and deliver a programme of learning for the Edexcel Level 3 BTEC Nationals in Engineering. The qualification structures set out the permitted combination of units learners need to complete the qualification. Each unit sets out the learning outcomes and grading criteria along with content, advice and guidance regarding appropriate delivery and assessment strategies. The following generic principles need to be adhered to so that a BTEC qualification is delivered to the appropriate standard.

- 1 The specification:** The specification gives the information needed for the successful delivery and achievement of the units and the qualification as a whole. The specification is of importance to the learner and the tutor alike. Individual units can be delivered and studied in isolation but the learner and the deliverer should have access to the full information provided to support the programme of learning.
- 2 The website:** Centres need to make regular use of the Edexcel website (www.edexcel.org.uk) to ensure that they have the most up-to-date information. In particular, the requirements for the external verification of the qualification receive regular updates, and appropriate information for centres is posted on the website. It is the responsibility of the centre to ensure that they are familiar with the latest BTEC NQF Level 2/3 (including Short Courses at Levels 1-3) Handbook and that they implement any related policy documentation which may have been posted on the website.
- 3 Policy:** This specification gives details of our assessment and quality assurance procedures. It includes advice about our policy regarding access to our qualifications, the design of programmes of study and delivery modes. Centres must ensure that they follow the procedures and conform to the policies outlined.
- 4 Recruitment:** Centres are required to recruit learners with integrity. A fundamental aspect of this integrity is that centres take appropriate steps to assess each applicant's potential and make a professional judgement about the applicant's ability to be able to successfully complete the programme of study and achieve the qualification. Centres should ensure that applicants have appropriate information and advice about the qualifications and that the qualification will meet their needs.

- 5 Assessment:** Centres are required to use this specification to design and deliver a programme of learning that will enable learners to achieve the grading criteria stipulated in the unit grading grids. The programme of learning should consist of assignments which provide the opportunity for coverage of all grading criteria as set out in the grading grid for each unit. Assignments must be reliable and fit for purpose, giving learners every opportunity to generate evidence which satisfies the grading criteria. Centres should use a variety of assessment methods, including case studies, assignments and work-based assessments, along with projects, performance observation and time-constrained assessments where appropriate.
- 6 Assignments:** Centres are encouraged to apply the grading criteria in a practical way. They should provide, wherever possible, a realistic scenario for learners to work with, and make maximum use of practical activities and work experience. The creation of assignments that are fit for purpose is vital to the learner's achievement.
- 7 National Qualifications Framework (NQF):** These qualifications have been accredited to the NQF and are eligible for public funding as determined by the DfES under Sections 96 and 97 of the Learning and Skills Act 2000. Details of the qualification units can be seen on the QCA OpenQuals database (www.openquals.org.uk).
- 8 Qualification Accreditation Numbers (QANs):** The qualification titles feature in the funding lists published annually by the DfES and on the regularly updated website www.dfes.gov.uk/. The NQF QANs should be used by centres when they seek public funding for their learners. The QANs are listed in *Annexe A*.
- 9 Accreditation:** This specification is accredited by the Qualifications and Curriculum Authority (QCA) until 31/08/10 and for certification of learners until 31/08/13. This specification may be updated during its period of accreditation and centres should refer to our website for the latest issue.
- 10 Approval:** Centres that have not previously offered BTEC qualifications must 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 will be 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.

What are BTEC Nationals?

BTEC Nationals are qualifications that are designed to provide specialist work-related qualifications in a range of sectors. They give learners the knowledge, understanding and skills that they need to prepare them for employment. The qualifications also provide career development opportunities for those already in work. Consequently they can provide a course of study for full-time or part-time learners in schools, colleges and training centres.

The family of BTEC Nationals includes Awards, Certificates and Diplomas which offer opportunities for nested provision and flexibility of delivery.

BTEC Nationals are designed to relate to the National Occupational Standards for the sector, where these are appropriate, and are supported by the relevant Standards Setting Body (SSB) or Sector Skills Council (SSC). Some BTEC Nationals form the Technical Certificate component of Apprenticeships and all attract UCAS points that equate to similar-sized general qualifications.

On successful completion of a BTEC National qualification, learners can progress into or within employment and/or continue their study in the same vocational area.

BTEC National Award

The 360 guided learning hours (GLH) (usually 6 units) BTEC National Award offers a specialist qualification that focuses on particular aspects of employment within the appropriate vocational sector. The BTEC National Award is a qualification which can extend a learner's programme of study and provide vocational emphasis for learners following an Applied GCE or GCE route or a combination of both in their main programme of study. The BTEC National Award is especially suitable for more mature learners, who wish to follow a shorter programme of study directly related to their work experience or to an area of employment that they wish to move into.

BTEC National Certificate

The 720 GLH (usually 12 units) BTEC National Certificate provides a specialist work-related programme of study that covers the key knowledge and practical skills required in the appropriate vocational sector. The BTEC National Certificate offers flexibility and a choice of emphasis through the specialist units. It is broadly equivalent to two GCEs or the full award AVCE.

The qualification 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 related GCE, a complementary NVQ or another qualification. These learning programmes can be developed to allow learners to study complementary qualifications without duplication of content.

For adult learners the BTEC National Certificate can extend their experience of work. It is a suitable qualification for those wishing to change career or move into a particular area of employment following a career break.

BTEC National Diploma

The 1080 GLH (usually 18 units) BTEC National Diploma extends the specialist work-related focus available from the BTEC Certificate. There is potential for the qualification to prepare learners for employment in the appropriate vocational sector and is suitable for those who have decided that they wish to enter a particular area of work.

Some adult learners may wish to complete this qualification in order to enter a specialist area of employment or progress into higher education. Other learners may want to extend the specialism that they followed on the BTEC National Certificate programme.

Progression from the BTEC National Diploma could be into employment where learners might take professional body examinations or complete NVQs. Alternatively, learners could continue to degree or other higher-education programmes in the same vocational sector or in a related sector.

National Occupational Standards (NOS)

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

Relevant aspects of the NOS are addressed in the learning outcomes and content of the units, and these links are identified where appropriate.

The Edexcel Level 3 BTEC Nationals in Engineering can contribute towards the knowledge and understanding requirements of the following SEMTA NOS:

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

Key features of the BTEC Nationals in Engineering

The BTEC Nationals in Engineering have been developed to focus on:

- education and training for employees in the engineering industries
- providing opportunities for engineering employees to achieve a nationally recognised Level 3 vocationally specific qualification
- giving learners the opportunity to gain a nationally recognised vocationally specific qualification, to enter employment in the engineering sector or to progress to higher education vocational qualifications such as the Edexcel Level 5 BTEC Higher Nationals in Mechanical Engineering or Electrical/Electronic Engineering
- giving learners the opportunity to develop a range of skills and techniques, personal skills and attitudes essential for successful performance in working life.

Rationale of the BTEC Nationals in Engineering

The engineering sector continues to suffer from a skills gap and needs to keep up with rapidly developing technologies. New entrants to the sector need to build the underpinning knowledge and specific skills required to meet the needs of modern engineering industries.

The revised BTEC National Award, Certificate and Diploma in Engineering are the result of a process of rationalisation which has taken into account:

- the knowledge and evidence requirements of the updated SEMTA National Occupational Standards and relevant NVQs at Level 3
- emerging Sector Skills Agreements and identified skills requirements
- the UK-SPEC – Specific Learning Outcomes for Engineering Technicians
- consultation feedback and guidance
- progression requirements in and to employment
- progression within/to Higher Education (eg BTEC Higher Nationals, BTEC Foundation Degrees and undergraduate engineering degree qualifications)
- existing provision and unit registrations.

The BTEC Nationals in Engineering have been designed with flexible qualification structures and a wide range of units so that learners can focus on their chosen career or area of interest. They 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 the different engineering titles and provide learners with the required underpinning knowledge of mathematics, science, business, 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.

Structure of the qualification

Edexcel Level 3 BTEC National Award in Engineering

The Edexcel Level 3 BTEC National Award in Engineering consists of two core units plus four specialist units.

The units for the Nationals in Engineering are on the CD ROM on the inside back cover page.

Edexcel Level 3 BTEC National Award in Engineering			
Unit	Core units	GLH	Level
2	Communications for Technicians	60	3
Unit	Core unit choice		
5 or	Electrical and Electronic Principles	60	3
6	Mechanical Principles and Applications	60	3
Specialist units			
4	Mathematics for Technicians	60	3
7	Health, Safety, Risk Assessment and Welfare in the Engineering Workplace	60	3
9	Commercial Aspects of Organisations Employing Engineers	60	3
10	Properties and Applications of Engineering Materials	60	3
12	Applications of Mechanical Systems and Technology	60	3
16	Engineering Drawing for Technicians	60	3
19	Mechanical Measurement and Inspection Techniques	60	3
21	Engineering Secondary/Finishing Processes	60	3
22	Fabrication Processes and Technology	60	3
23	Applications of Welding Technology	60	3
25	Selection and Applications of Programmable Logic Controllers	60	3
26	Computer Numerical Control of Machine Tools	60	3
30	Setting and Proving Secondary Processing Machines	60	3
31	Computer Aided Manufacturing	60	3
35	Principles and Applications of Electronic Devices and Circuits	60	3
39	Metallurgical Techniques	60	3
44	Engineering Maintenance Procedures and Techniques	60	3
45	Monitoring and Fault Diagnosis of Engineering Systems	60	3

Unit	Specialist units (<i>continued</i>)		
49	Function and Characteristics of Railway Signalling Systems	60	3
54	Electronic Measurement and Testing	60	3
59	Railway Infrastructure Construction and Maintenance	60	3
62	Microprocessor Systems and Applications	60	3
64	Electrical Applications	60	3
70	Aircraft Workshop Principles and Practices	60	3
71	Theory of Flight	60	3
76	Aircraft Maintenance Practices	60	3

Edexcel Level 3 BTEC National Certificate in Engineering

The Edexcel Level 3 BTEC National Certificate in Engineering consists of six core units plus five specialist units.

The units for the Nationals in Engineering are on the CD ROM on the inside back cover page.

Edexcel Level 3 BTEC National Certificate in Engineering			
Unit	Core units	GLH	Level
1	Business Systems for Technician	60	3
2	Communications for Technicians	60	3
3	Engineering Project	120	3
4	Mathematics for Technicians	60	3
5	Electrical and Electronic Principles	60	3
6	Mechanical Principles and Applications	60	3
Specialist units			
7	Health, Safety, Risk Assessment and Welfare in the Engineering Workplace	60	3
8	Engineering Design	60	3
9	Commercial Aspects of Organisations Employing Engineers	60	3
10	Properties and Applications of Engineering Materials	60	3
11	Further Mechanical Principles and Applications	60	3
12	Applications of Mechanical Systems and Technology	60	3
13	Principles and Applications of Fluid Mechanics	60	3
14	Principles and Applications of Thermodynamics	60	3
15	Electro, Pneumatic and Hydraulic Systems and Devices	60	3
16	Engineering Drawing for Technicians	60	3
17	Computer Aided Drafting	60	3
18	Advanced Mechanical Principles and Applications	60	3
19	Mechanical Measurement and Inspection Techniques	60	3
20	Engineering Primary Forming Processes	60	3
21	Engineering Secondary/Finishing Processes	60	3
22	Fabrication Processes and Technology	60	3
23	Applications of Welding Technology	60	3
25	Selection and Applications of Programmable Logic Controllers	60	3

Unit	Specialist units (<i>continued</i>)		
26	Computer Numerical Control of Machine Tools	60	3
27	Welding Principles	60	3
28	Further Mathematics for Technicians	60	3
34	Electronic Circuit Manufacture	60	3
35	Principles and Applications of Electronic Devices and Circuits	60	3
52	Electrical Technology	60	3
53	Electrical Installation	60	3
54	Electronic Measurement and Testing	60	3
60	Principles and Applications of Analogue Electronics	60	3
61	Construction and Applications of Digital Systems	60	3
62	Microprocessor Systems and Applications	60	3
63	Electronic Fault-finding	60	3
64	Electrical Applications	60	3
65	Three-Phase Systems	60	3
66	Three-Phase Motors and Drives	60	3
67	Further Electrical Principles	60	3

Edexcel Level 3 BTEC National Diploma in Engineering

The BTEC National Diploma in Engineering consists of six core units plus eleven specialist units.

The units for the Nationals in Engineering are on the CD ROM on the inside back cover page.

Edexcel Level 3 BTEC National Diploma in Engineering			
Unit	Core units	GLH	Level
1	Business Systems for Technician	60	3
2	Communications for Technicians	60	3
3	Engineering Project	120	3
4	Mathematics for Technicians	60	3
5	Electrical and Electronic Principles	60	3
6	Mechanical Principles and Applications	60	3
Specialist units			
7	Health, Safety, Risk Assessment and Welfare in the Engineering Workplace	60	3
8	Engineering Design	60	3
9	Commercial Aspects of Organisations Employing Engineers	60	3
10	Properties and Applications of Engineering Materials	60	3
11	Further Mechanical Principles and Applications	60	3
12	Applications of Mechanical Systems and Technology	60	3
13	Principles and Applications of Fluid Mechanics	60	3
14	Principles and Applications of Thermodynamics	60	3
15	Electro, Pneumatic and Hydraulic Systems and Devices	60	3
16	Engineering Drawing for Technicians	60	3
17	Computer Aided Drafting	60	3
18	Advanced Mechanical Principles and Applications	60	3
19	Mechanical Measurement and Inspection Techniques	60	3
20	Engineering Primary Forming Processes	60	3
21	Engineering Secondary/Finishing Processes	60	3
22	Fabrication Processes and Technology	60	3
23	Applications of Welding Technology	60	3
25	Selection and Applications of Programmable Logic Controllers	60	3
26	Computer Numerical Control of Machine Tools	60	3

Unit	Specialist units (<i>continued</i>)		
27	Welding Principles	60	3
28	Further Mathematics for Technicians	60	3
34	Electronic Circuit Manufacture	60	3
35	Principles and Applications of Electronic Devices and Circuits	60	3
52	Electrical Technology	60	3
53	Electrical Installation	60	3
54	Electronic Measurement and Testing	60	3
60	Principles and Applications of Analogue Electronics	60	3
61	Construction and Applications of Digital Systems	60	3
62	Microprocessor Systems and Applications	60	3
63	Electronic Fault-finding	60	3
64	Electrical Applications	60	3
65	Three-Phase Systems	60	3
66	Three-Phase Motors and Drives	60	3
67	Further Electrical Principles	60	3

Unit format

All units in Edexcel Level 3 BTEC National 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 is accredited by QCA and this form of words will appear on the learner's Notification of Performance (NOP).

NQF level

This is the level of the unit within the National Qualifications Framework (NQF). The level of the unit has been informed by the NICATs level descriptors and, where appropriate, the NOS and/or other sector/professional benchmarks.

Guided learning hours (GLH)

In BTEC National qualifications each unit consists of 30, 60, 90 or 120 GLH. Guided learning hours are 'a notional measure of the substance of a unit'. GLH include an estimate of time that might be allocated to direct teaching, instruction and assessment, together with other structured learning time such as directed assignments or supported individual study. It excludes learner-initiated private study. Centres are advised to consider this definition when planning the programme of study associated with this qualification.

Unit abstract

The unit abstract gives the reader an appreciation of the value 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 aims of the unit and the key knowledge, skills and understanding developed while studying the unit. The unit abstract 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 gives centres the substance to devise and plan the programme of learning needed for the learning outcomes to be successfully achieved. Evidence to meet the grading criteria will include relevant areas of the unit content as described in the assessment section of the unit. Where appropriate, this is informed by the underpinning knowledge and understanding requirements of the related National Occupational Standards (NOS).

The unit content sets out each learning outcome with prescribed key phrases or concepts listed in italics followed by the range of related topics. Detailed lists provide an indicative range to support the specific topic item. Not all of the unit content is expected to be assessed in every unit.

Grading grid

Each grading grid contains statements of the assessment 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 refer to a qualitative improvement in the learner's evidence, and not a quantitative one.

Essential guidance for tutors

This section is designed to give tutors additional guidance and amplification in order to provide 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.
- *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.
- *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 Edexcel to offer the qualification.
- *Indicative reading for learners* – provides a short list of learner resource material that benchmarks the level of study.

Key skills

This section identifies any opportunities in the unit for learners to generate evidence to meet the requirements of key skills units. Assessors should take care to become familiar with the key skills specifications and evidence requirements and not to rely solely on this section when presenting key skills evidence for moderation. Centres should refer to the QCA website (www.qca.org.uk) for the latest version of the key skills standards.

Assessment and grading

The purpose of assessment is to ensure that effective learning has taken place.

Assignments constructed by centres should be reliable and fit for purpose, and should build on the application of the grading criteria. Centres should use a variety of assessment methods, including case studies, assignments and work-based assessments, along with projects, performance observation and time-constrained assessments. Centres are encouraged to emphasise the practical application of the 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 learners' achievement and their importance cannot be over-emphasised.

All of the criteria listed in the grading grid for each unit must be covered by one assignment, or by a series of assignments. It is advisable that criteria are clearly indicated on each assignment to provide a clear focus for learners and to assist with internal verification and standardisation processes. This will also help to ensure that feedback is specific to the criteria. Tasks and activities should enable learners to produce evidence that relates directly to the specified criteria.

When reading the grading grids and designing assignments, centres should note that for learners to achieve a merit/distinction grade they will be required to provide evidence that is qualitative, not quantitative, in its nature. Centres are encouraged to look across the units' grading grids to identify common topics.

Grading domains

The grading criteria are developed in relation to grading domains which provide for the assessment of the learning outcomes of the unit. There are four BTEC National grading domains which underpin the grading criteria:

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

The qualitative nature of the merit and distinction grading criteria is based on indicative characteristics of the evidence to fulfil the higher grades. Please refer to *Annexe B*.

A grading scale of pass, merit and distinction is applied to all units.

In Edexcel BTEC Nationals all units are internally assessed.

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

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

- to achieve a ‘distinction’ a learner must additionally have satisfied **all** the distinction criteria.

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

Quality assurance

Edexcel’s qualification specifications set out the standard to be achieved by each learner in order to be awarded the qualification. This is covered in the statement of learning outcomes 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 additional guidance and amplification related to the unit to support tutors, deliverers and assessors and to provide for a coherence of understanding and a consistency of delivery and assessment.

Edexcel operates an independent, external quality assurance process which is designed to ensure that these standards are maintained by all internal verifiers and external verifiers. It achieves this through the following activities.

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.

Centres wishing to offer a vocational area for the first time will need to apply for approval to offer the programme.

When a centre applies for approval to offer a BTEC qualification they will be 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.

Risk assessment

Edexcel has an approval process which creates a quality profile of each qualification programme in each centre and for the centre as a whole. This profile helps to determine how the programme will be externally verified and will also be used to initiate other quality control measures by Edexcel.

Internal verification

Centres are required to have processes in place that review each assessor's decisions. This ensures that they are correctly interpreting and applying the standards set out in the specifications. The system used to do this is a matter for individual centres and Edexcel fully supports the use of the centre's own quality assurance systems where they ensure robust internal standardisation.

Centres should refer to the BTEC NQF Level 2/3 (including Short Courses at Levels 1-3) Handbook (updated annually). This information can also be found on our website www.edexcel.org.uk then click on 'Services for Centres' and then 'FE Colleges & Schools'.

External verification

Edexcel will sample assessors' decisions using sector-specialist external verifiers. For BTEC Nationals this process will follow the National Standards Sampling (NSS) protocol.

Learners' work **must** be internally assessed. Additionally, at least 50 per cent of submitted work **must** be internally verified.

Centres should refer to the BTEC NQF Level 2/3 (including Short Courses at Levels 1-3) Handbook (updated annually). This updated information can also be found on our website, go to www.edexcel.org.uk then click on 'Services for Centres' and then 'FE Colleges & Schools'.

Calculation of the qualification grade

Awarding a qualification grade

The qualification grade will be calculated through the aggregation of points achieved through the successful achievement of individual units. The number of points available will be dependent on the unit grade achieved and the size of the unit as determined by the stipulated guided learning hours.

For the calculation of a qualification grade for a BTEC National a learner must:

- complete all designated units
- achieve a minimum points score of
 - 36 points for a National Award
 - 72 points for a National Certificate
 - 108 points for a National Diploma
- achieve a pass (or above) grade for units with a combined total of
 - 300 guided learning hours for a National Award
 - 600 guided learning hours for a National Certificate
 - 900 guided learning hours for a National Diploma.

Unit points

Size of unit (GLH)	Pass grade	Merit grade	Distinction grade
10	1	2	3
30	3	6	9
60	6	12	18
90	9	18	27
120	12	24	36

Grade boundaries and UCAS points (as of 1st January 2007)

Grade boundaries BTEC National Award	Overall grade BTEC National Award		UCAS points
36-59	Pass	P	40
60-83	Merit	M	80
84-108	Distinction	D	120

Grade boundaries BTEC National Certificate	Overall grade BTEC National Certificate		UCAS points
72-95	PP		80
96-119	MP		120
120-143	MM		160
144-167	DM		200
168-216	DD		240

Grade boundaries BTEC National Diploma	Overall grade BTEC National Diploma		UCAS points
108-131	PPP		120
132-155	MPP		160
156-179	MMP		200
180-203	MMM		240
204-227	DMM		280
228-251	DDM		320
252-324	DDD		360

Programme design and delivery

BTEC National qualifications consist of core units (which are mandatory) and specialist units. Specialist units are designed to provide a specific focus to the qualification. Required combinations of specialist units are set out clearly in relation to each qualification in the defined qualification structures in this document.

In BTEC Nationals each unit is 30, 60, 90 or 120 guided learning hours (GLH). The GLH includes an estimate of time that might be allocated to direct teaching, instruction and assessment, together with other structured learning time such as directed assignments or supported individual study. It excludes learner-initiated private study. Centres are advised to consider this definition when planning the programme of study associated with this specification.

Mode of delivery

Edexcel does not define the mode of study for BTEC Nationals. Centres are free to offer the qualifications using any mode of delivery that meets their learner's needs. This may be through traditional classroom teaching, open learning, distance learning or a combination of the three. Whichever mode of delivery 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. 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

BTEC Nationals 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 fully familiar with current practice and standards in the sector concerned. Centres will need to meet any specialist resource requirements when they seek approval from Edexcel.

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

Delivery approach

It is important that centres develop an approach to teaching and learning that supports the specialist vocational nature of BTEC National qualifications. 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.

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 National qualification and the NVQs and key skills that also contribute to the scheme.

Accreditation of Prior Learning (APL)

Edexcel encourages centres to recognise learners' previous achievements and experiences through APL. Learners may have evidence that has been generated during previous study or in their previous or current employment or whilst undertaking voluntary work that relates to one or more of the units in the qualification. Assessors should map this evidence against the grading criteria in the specification and make this evidence available to the external verifier. As with all evidence, assessors should be satisfied about the authenticity and currency of the material when considering whether or not the learning outcomes of the unit have been met.

Full guidance on Edexcel's policy on APL is provided on our website, go to www.edexcel.org.uk then click on 'About Us' and then 'Policies for Centres'.

Meeting local needs

Centres should note that the qualifications set out in these specifications have been developed in consultation with centres and employers, particularly the Sector Skills Councils or the Standards Setting Bodies for the relevant sector. The units are designed to meet the skill needs of the sector and the specialist units allow coverage of the full range of employment. Centres should make maximum use of the choice available to them within the specialist units in these specifications to meet the needs of their learners, and the local skills and training needs identified by organisations such as the Regional Development Agency and the local Learning and Skills Council.

In certain circumstances, units in this specification might not allow centres to meet a local need. In this situation, centres can seek approval from Edexcel to make use of units from other standard NQF BTEC National specifications. Centres will need to justify the need for importing units from other specifications and Edexcel will ensure that the vocational focus of the qualification has not been diluted. Units that have externally set assignments cannot be imported into other qualifications.

There may be exceptional circumstances where even this flexibility does not meet a particular local need. In this case, centres can seek permission from Edexcel to develop a unit with us to meet this need. There are very few cases where this will be allowed. Centres will need strong evidence of the local need and the reasons why our standard units are inappropriate. Edexcel will need to submit these units for accreditation by QCA.

Limitations on variations from standard specifications

The flexibility to import standard units from other BTEC Nationals and/or develop unique units is limited to a total of:

- $\frac{2}{9}$ (for example four 60 GLH units) in a BTEC National Diploma qualification
- $\frac{1}{6}$ (for example two 60 GLH units) in a BTEC National Certificate qualification
- $\frac{1}{6}$ (for example one 60 GLH unit) in a BTEC National Award qualification.

The use of these units cannot be at the expense of the core units in any qualification.

Access and recruitment

Edexcel'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 also show regard for Edexcel's policy on learners with particular requirements.

Centres will need to review the 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 First qualification in Engineering or a related vocational area
- an Intermediate GNVQ in an appropriate vocational area
- a GCSE equivalent to four passes at grade 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 National qualifications are accredited on the NQF for learners aged 16 years and over. Learners aged 15 and under cannot be registered for a BTEC National qualification.

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 police checks.

Edexcel Level 3 BTEC Nationals are listed on the DfES funding lists Section 96 and Section 97.

Access arrangements and special considerations

Edexcel's policy on access arrangements and special considerations for BTEC and Edexcel NVQ qualifications aims to enhance access to the qualifications for learners with disabilities and other difficulties (as defined by the 1995 Disability Discrimination Act and the amendments to the Act) without compromising the assessment of skills, knowledge, understanding or competence.

Further details are given in the policy 'Access Arrangements and Special Considerations for BTEC and Edexcel NVQ Qualifications', which is on the Edexcel website (www.edexcel.org.uk). This policy replaces the previous Edexcel policy (Assessment of Vocationally Related Qualification: Regulations and Guidance Relating to Learners with Special Requirements, 2002) concerning learners with particular requirements.

The Edexcel BTEC Qualification Framework for the Engineering sector

Progression opportunities within the framework are available vertically, diagonally and horizontally.

NQF Level	General Qualifications	BTEC full VRQ courses	BTEC Short Courses	NVQ/occupational
8				
7				
6				
5		HNC/D in Manufacturing Engineering		
		HNC/D in Mechanical Engineering		
		HNC/D in Electrical/Electronic Engineering		
		HNC/D in Operations Engineering		
4		HNC/D in Aerospace Engineering		
		HNC/D in Marine Engineering		

NQF Level	General Qualifications	BTEC full VRQ courses	BTEC Short Courses	NVQ/occupational
3	GCE Engineering	NA/NC/ND in Engineering NC/D in Mechanical Engineering NC/D in Manufacturing Engineering		
		NA/NC/D in Engineering NC/D in Electrical/Electronic Engineering NC/D in Operations and Maintenance Engineering NC/D in Communications Technology		
2	GCSE Engineering			Level 2 NVQ in Performing Engineering Operations
	GCSE Manufacturing			
1		Introductory Certificate and Diploma in Engineering		Level 1 NVQ in Performing Engineering Operations
Entry		Entry Level Certificate in Skills for Working Life – Practical Skills		

Further information

For further information please call Customer Services on 0870 240 9800 (calls may be recorded for training purposes) or visit our website at www.edexcel.org.uk.

Useful publications

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

Edexcel Publications

Adamsway

Mansfield

Nottinghamshire NG18 4FN

Telephone: 01623 467 467

Fax: 01623 450 481

Email: publications@linneydirect.com

Related information and publications include:

- *Accreditation of Prior Learning* available on our website: www.edexcel.org.uk
- *Guidance for Centres Offering Edexcel/BTEC NQF Accredited Programmes* – (Edexcel, distributed to centres annually)
- key skills publications – specifications, tutor support materials and question papers
- *The Statutory Regulation of External Qualifications in England, Wales and Northern Ireland* – (QCA, 2004)
- the current Edexcel publications catalogue and update catalogue.

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

National Occupational Standards are available from:

SEMTA

14 Upton Road

Watford

Hertfordshire WD18 0JT

Telephone: 01923 238 441

Website: www.semta.org.uk

Professional development and training

Edexcel 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 key skills into your programme
- building in effective and efficient quality assurance systems.

The national programme of training we offer can be viewed on the Edexcel website (www.edexcel.org.uk). You can request customised training through the website or by contacting one of our advisers in the Professional Development and Training team via Customer Services on telephone 0870 240 9800 (calls may be recorded for training purposes) 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

QCA codes

The QCA National Qualifications Framework (NQF) code is known as a Qualification Accreditation Number (QAN). This is the code that features in the DfES Funding Schedules, Section 96 and 97 and is to be used for all qualification funding purposes. Each unit within a qualification will also have a QCA NQF unit code.

The QCA qualification and unit codes will appear on the learner's final certification documentation.

The QANs for the qualifications in this publication are:

Edexcel Level 3 BTEC National Award in Engineering	500/1761/5
Edexcel Level 3 BTEC National Certificate in Engineering	500/1760/3
Edexcel Level 3 BTEC National Diploma in Engineering	500/1749/4

These qualification titles will appear on the learners' certificates. Learners need to be made aware of this when they are recruited by the centre and registered with Edexcel. Providing this happens, centres are able to describe the programme of study leading to the award of the qualification in different ways to suit the medium and the target audience.

Annexe B

Grading domains: Level 3 BTEC generic grading domains

Grading domain 1	Indicative characteristics – Merit	Indicative characteristics – Distinction
<p>Application of knowledge and understanding</p> <p>(Learning outcome stem <i>understand or know</i>)</p>	<ul style="list-style-type: none"> • Shows depth of knowledge and development of understanding in familiar and unfamiliar situations (eg 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 p criteria. 	<ul style="list-style-type: none"> • Synthesises knowledge and understanding across p/m 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/contexts. • Shows relationships with p/m criteria. • Responds positively to evaluation.

Grading domain 2	Indicative characteristics – Merit	Indicative characteristics – Distinction
<p>Development of practical and technical skills (Learning outcome stem <i>be able to</i>)</p>	<ul style="list-style-type: none"> • 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 p criteria. 	<ul style="list-style-type: none"> • 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 p and m criteria.

Grading domain 3	Indicative characteristics – Merit	Indicative characteristics – Distinction
<p>Personal development for occupational roles</p> <p>(Any learning outcome stem)</p>	<ul style="list-style-type: none"> • 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). 	<ul style="list-style-type: none"> • 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
<p>Application of generic skills (Any learning outcome stem)</p>	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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

Key skills

All BTEC National qualifications include mapping and/or signposting of key skills. These are transferable skills, which play an essential role in developing personal effectiveness for adult and working life and in the application of specific vocational skills.

In each unit the opportunities for the generation of evidence for key skills are signposted. These are indicative links only. Tutors will need to become familiar with key skills specifications and their evidence requirements and they are advised not to rely on the signposting in the units when presenting key skills evidence for moderation. Centres should refer to the QCA website (www.qca.org.uk) for the latest key skills standards.

Key skills provide a foundation for continual learning. They enable and empower individuals who inevitably face a series of choices in work, education and training throughout their lives. Current and future initiatives such as learndirect, lifelong learning and widening participation all require a more flexible population in the workplace and key skills play a role in setting the framework.

Learners need the chance to show current and future employers that they can:

- communicate effectively, in a variety of situations, using a wide range of techniques
- work well with others – individuals or teams – so that work can be properly planned and targets met
- manage their own development, so that they are always ready to take on the challenges of change and diversification
- use number, not just within routine tasks and functions but to help them be more effective and efficient in all they do
- use ICT in a range of applications to support all aspects of their role
- solve problems in a variety of circumstances.

Key skills mapping – summary of opportunities suggested in each unit

Key skills	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8	Unit 9	Unit 10	Unit 11
N3.1	✓		✓	✓	✓	✓					✓
N3.2	✓		✓	✓	✓	✓					✓
N3.3	✓		✓	✓	✓	✓		✓			✓
C3.1a		✓									
C3.1b	✓	✓	✓								
C3.2		✓	✓						✓		
C3.3	✓	✓	✓				✓	✓	✓	✓	
ICT3.1		✓	✓		✓			✓			
ICT3.2		✓			✓			✓			
ICT3.3		✓	✓		✓			✓			
LP3.1		✓	✓				✓				
LP3.2		✓	✓								
LP3.3		✓	✓								
PS3.1					✓	✓		✓			✓
PS3.2					✓	✓	✓				✓
PS3.3					✓	✓	✓				✓
WO3.1											
WO3.2											
WO3.3											

Key skills	Unit 12	Unit 13	Unit 14	Unit 15	Unit 16	Unit 17	Unit 18	Unit 19	Unit 20	Unit 21	Unit 22
N3.1		✓	✓			✓	✓	✓			
N3.2			✓				✓				
N3.3		✓	✓				✓				
C3.1a											
C3.1b											
C3.2	✓			✓				✓		✓	
C3.3								✓	✓	✓	✓
ICT3.1				✓							
ICT3.2											
ICT3.3					✓						
LP3.1											
LP3.2											
LP3.3											
PS3.1		✓	✓	✓	✓	✓	✓				✓
PS3.2		✓	✓		✓		✓				
PS3.3		✓	✓				✓				
WO3.1											
WO3.2											
WO3.3											

Key skills	Unit 23	Unit 25	Unit 26	Unit 27	Unit 28	Unit 35	Unit 36	Unit 52	Unit 53	Unit 54	Unit 60
N3.1			✓		✓	✓			✓	✓	✓
N3.2					✓	✓			✓	✓	✓
N3.3					✓	✓			✓	✓	✓
C3.1a											
C3.1b						✓					
C3.2		✓		✓			✓	✓	✓	✓	✓
C3.3		✓	✓	✓		✓	✓	✓	✓	✓	✓
ICT3.1		✓				✓		✓	✓	✓	✓
ICT3.2		✓	✓			✓		✓	✓	✓	✓
ICT3.3		✓				✓		✓	✓	✓	✓
LP3.1											
LP3.2											
LP3.3											
PS3.1	✓	✓		✓			✓		✓	✓	✓
PS3.2		✓	✓				✓		✓	✓	✓
PS3.3		✓	✓						✓	✓	✓
WO3.1											
WO3.2											
WO3.3											

Key skills	Unit 61	Unit 62	Unit 63	Unit 64	Unit 65	Unit 66	Unit 67	Unit 70	Unit 71	Unit 76
N3.1	✓	✓	✓	✓					✓	
N3.2	✓	✓	✓	✓			✓		✓	
N3.3	✓	✓	✓	✓			✓		✓	
C3.1a										
C3.1b										
C3.2	✓	✓	✓	✓				✓		
C3.3	✓	✓	✓	✓	✓	✓			✓	✓
ICT3.1	✓	✓	✓	✓			✓			
ICT3.2	✓	✓	✓	✓			✓			
ICT3.3	✓	✓	✓	✓			✓			
LP3.1										
LP3.2										
LP3.3										
PS3.1		✓	✓				✓			✓
PS3.2		✓	✓				✓			✓
PS3.3		✓	✓				✓			✓
WO3.1										
WO3.2										
WO3.3										

Annexe D

National Occupational Standards/mapping with NVQs

The following grid maps the knowledge covered in the BTEC Nationals in Engineering against the underpinning knowledge of the Level 3 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 and understanding.

NVQ	BTEC unit									
	1	2	3	4	5	6	7	8	9	10
Level 3 NVQ in Mechanical Manufacturing Engineering		Unit 2					Unit 1			
Level 3 NVQ in Business Improvement Techniques	Unit 1	Unit 2	Units 1, 13				Unit 1			
Level 3 NVQ in Engineering Leadership		Unit 3	Units 4, 5, 7				Unit 1			
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, 34					

NVQ	BTEC unit										
	11	12	13	14	15	16	17	18	19	20	
Level 3 NVQ in Mechanical Manufacturing Engineering					Units 6, 9	Units 2, 3, 4, 6, 7, 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
Level 3 NVQ in Business Improvement Techniques									Unit 24		
Level 3 NVQ in Engineering Technical Support							Units 4, 5, 6, 7, 8, 9, 10		Units 11, 17		

NVQ	BTEC unit									
	21	22	23	25	26	27	28	34	36	52
Level 3 NVQ in Mechanical Manufacturing Engineering	Units 5, 7, 9, 17, 19, 21, 23, 25, 61, 72				Units 30, 31, 32, 33, 34, 35, 36, 37, 50, 51					
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 Engineering Technical Support				Units 30, 32	Unit 29, 30, 36, 37, 38, 42					
Level 3 NVQ in Fabrication and Welding Engineering		Units 22, 23, 24, 25, 27, 28, 32, 33, 34, 35, 36, 37, 38	Units 4, 5, 6, 7, 16, 17, 18, 20							
Level 3 NVQ in Electrical and Electronic Engineering								Units 4, 10, 11, 12, 13		

NVQ	BTEC unit												
	53	54	60	61	62	63	64	65	66	67	70	71	76
Level 3 NVQ in Electrical and Electronic Engineering	Units 12, 14		Units 15, 16, 17, 18	Units 15, 16, 17, 18				Units 1, 34	Units 26, 27, 28, 29, 30				
Level 3 NVQ in Engineering Maintenance		Units 17, 40				Units 17, 40							
Level 3 NVQ in Aeronautical Engineering											Units 39, 62, 76	Units 46, 59	Units 135, 136, 155, 159

Annexe E

BTEC National Award in Engineering (old)/BTEC National Award in Engineering (new) – unit mapping

Rationale

When developing the new units and qualifications, content from the old units was reviewed and altered to more accurately reflect the sector requirements by aligning the content closer to the National Occupational Standards (NOS).

The new units have been designed to give more flexibility for the user, centre and learner by careful use of ‘egs’ within the unit content.

A quick overview is included to give a summary of the relationship between the new units and those of the old National Award in Engineering. This is followed by a more detailed review.

The following annotation has been used throughout this mapping exercise:

LO = Learning outcome

Old = September 2004 National Award in Engineering

New = September 2007 National Award in Engineering.

Although the BTEC National Certificate and Diploma in Engineering are new qualifications from 2007, many of the units are revised versions of those available in the old 2004 engineering titles. Therefore old/new mapping for these units is available in the respective revised qualifications.

BTEC National Award in Engineering (old)/BTEC National Award in Engineering (new) – unit mapping overview

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Old units																					
New units																					
Unit 2	F																				
Unit 4			F																		
Unit 5		P		F																	
Unit 6		P							P												
Unit 7													P		F						
Unit 9												P		P							
Unit 10								F													
Unit 12											P										
Unit 16												P	P								
Unit 19																					
Unit 21																F					
Unit 22																		F			
Unit 23																					F
Unit 25																					
Unit 26																	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)

BTEC National Award in Engineering (old)/BTEC National Award in Engineering (new) – unit mapping overview

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Old units																					
New units																					
Unit 30																P					
Unit 31																					
Unit 35																					
Unit 39																					
Unit 44																					F
Unit 45																					
Unit 49																					
Unit 54																					
Unit 59																					
Unit 62							P														
Unit 64						P															
Unit 70																					
Unit 71																					
Unit 76																					

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)

BTEC National Award in Engineering (old)/BTEC National Award in Engineering (new) – unit mapping overview

	22	23	24	25																
Old units																				
New units																				
Unit 2																				
Unit 4																				
Unit 5																				
Unit 6																				
Unit 7																				
Unit 9																				
Unit 10																				
Unit 12																				
Unit 16																				
Unit 19																				
Unit 21																				
Unit 22																				
Unit 23																				
Unit 25																				
Unit 26																				
Unit 30																				

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)

BTEC National Award in Engineering (old)/BTEC National Award in Engineering (new) – unit mapping in depth

New units		Old units		Mapping/comments (<i>new topics in italics</i>)
Number	Name	Number	Name	
Unit 2	Communications for Technicians	Unit 1	Communications for Technicians	F Full coverage.
Unit 4	Mathematics for Technicians	Unit 3	Mathematics for Technicians	F Full coverage.
Unit 5	Electrical and Electronic Principles	Unit 2	Science for Technicians	P All topics within LO2 are covered.
		Unit 4	Electrical and Electronic Principles	F Full coverage.
Unit 6	Mechanical Principles and Applications	Unit 2	Science for Technicians	P Some of the topics within LO1 and LO3 are covered.
		Unit 10	Mechanical Principles	P All topics within LO1 are covered.
Unit 7	Health, Safety, Risk Assessment and Welfare in the Engineering Workplace	Unit 14	Engineering Workplace Practices	P Some topics within LO4 are covered.
		Unit 15	Health, Safety and Welfare	F Full coverage.
Unit 9	Commercial Aspects of Organisations Employing Engineers	Unit 14	Engineering Workplace Practices	P All topics within LO4 are covered and some of the topics within LO1, LO2 and LO3.
Unit 10	Properties and Applications of Engineering Materials	Unit 9	Engineering Materials	F Full coverage, <i>now also includes SMART materials.</i>
Unit 12	Applications of Mechanical Systems and Technology	Unit 11	Mechanical Technology	P All topics within LO1, LO2 and LO3 are covered and most of the topics within LO4.

New units		Old units		Mapping/comments (<i>new topics in italics</i>)
Number	Name	Number	Name	
Unit 16	Engineering Drawing for Technicians	Unit 12	Engineering Drawing	P All topics within LO1 are covered.
Unit 19	Mechanical Measurement and Inspection Techniques	Unit 13	Computer-Aided Design	P All topics within LO3 and LO4 are covered. <i>A new unit for the National Award programme.</i>
Unit 21	Engineering Secondary/Finishing Processes	Unit 16	Finishing/Secondary Processes	F Full coverage.
Unit 22	Fabrication Processes and Technology	Unit 19	Fabrication Processes and Technology	F Full coverage; however there is less emphasis on pattern development and more emphasis on planning and carrying out the manufacture of a fabricated structure.
Unit 23	Applications of Welding Technology	Unit 20	Welding Processes Technology	P All topics within LO1, LO2 and LO4 are covered and the majority of the topics within LO3. Plastics joining processes are not covered.
Unit 25	Selection and Applications of Programmable Logic Controllers			<i>A new unit for the National Award programme.</i>
Unit 26	Computer Numerical Control of Machine Tools	Unit 17	CNC Machining	F Full coverage, the new unit does not require evaluation at pass level.
Unit 30	Setting and Proving Secondary Processing Machines	Unit 16	Finishing/Secondary Processes	p All topics within LO1 are covered except presswork.
Unit 31	Computer-aided Manufacturing			<i>A new unit for the National Award programme.</i>

New units		Old units		Mapping/comments (<i>new topics in italics</i>)
Number	Name	Number	Name	
Unit 35	Principles and Applications of Electronic Devices and Circuits			<i>A new unit for the National Award programme.</i>
Unit 39	Metallurgical Techniques			<i>A new unit for the National Award programme.</i>
Unit 44	Engineering Maintenance Procedures and Techniques	Unit 21	Operations and Maintenance Procedures and Techniques	F Full coverage.
Unit 45	Monitoring and Fault Diagnosis of Engineering Systems	Unit 22	Monitoring and Fault Diagnosis	F Full coverage.
Unit 49	Functions and Characteristics of Railway Signalling Systems			<i>A new unit for the National Award programme.</i>
Unit 54	Electronic Measurement and Testing			<i>A new unit for the National Award programme.</i>
Unit 59	Railway Infrastructure Construction and Maintenance			<i>A new unit for the National Award programme.</i>
Unit 62	Microprocessor Systems and Applications	Unit 7	Microelectronics	P All topics within LO4 are covered and most topics within LO1, LO2 and LO3, although a lot of the <i>content has been re-arranged.</i>
Unit 64	Electrical Applications	Unit 6	Electrical Applications	P All topics within LO4 are covered, most topics within LO3 and some topics within LO1 and LO2.

New units		Old units		Mapping/comments (<i>new topics in italics</i>)
Number	Name	Number	Name	
Unit 70	Aircraft Workshop Principles and Practices	Unit 24	Aircraft Workshop Principles and Practices	F Full coverage.
Unit 71	Theory of Flight	Unit 25	Theory of Flight	F Full coverage.
Unit 76	Aircraft Maintenance Practices	Unit 23	Aircraft Maintenance Practices	P All topics within LO1, LO2 and LO4 are covered and most topics within LO3.
		Unit 5	Electronics	No new unit.
		Unit 8	Electro, Pneumatic and Hydraulic Systems and Devices	No new unit.
		Unit 18	Primary Forming Processes	No new unit.

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)

Annexe F

Wider curriculum mapping

Study of the Edexcel Level 3 BTEC Nationals in Engineering gives learners opportunities to develop an understanding of spiritual, moral, ethical, social and cultural issues as well as an awareness of environmental issues, European developments, health and safety considerations and equal opportunities issues.

The Edexcel Level 3 BTEC Nationals in Engineering makes a positive contribution to wider curricular areas as appropriate.

Moral, ethical, social and cultural issues

The specification contributes to an understanding of moral, ethical, social and cultural issues, especially when learners are dealing with colleagues and customers.

Environmental issues

Learners are led to appreciate the importance of environmental issues throughout the engineering sector. Many of the units allow learners to consider the influence that engineering processes have on the environment and the ways that this impact can be reduced.

European developments

Much of the content of the Edexcel Level 3 BTEC Nationals in Engineering applies throughout Europe, even though the delivery is in a UK context.

Health and safety considerations

The Edexcel Level 3 BTEC Nationals in Engineering are practically based and health and safety issues are encountered throughout the units. Learners will develop awareness of the safety of others as well as themselves in all practical activities.

Equal opportunities issues

Equal opportunities issues are implicit throughout the Edexcel Level 3 BTEC Nationals in Engineering.

Wider curriculum mapping

	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8	Unit 9	Unit 10	Unit 11	Unit 12	Unit 13	Unit 14	Unit 15
Moral and ethical issues	✓						✓		✓						
Social and cultural issues	✓						✓		✓						
Environmental issues	✓		✓				✓		✓						✓
European developments	✓	✓	✓		✓		✓	✓	✓	✓					✓
Health and safety considerations	✓		✓				✓		✓						✓
Equal opportunities issues	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

	Unit 16	Unit 17	Unit 18	Unit 19	Unit 20	Unit 21	Unit 22	Unit 23	Unit 25	Unit 26	Unit 27	Unit 28	Unit 34	Unit 36	Unit 52
Moral and ethical issues															
Social and cultural issues															
Environmental issues			✓		✓	✓		✓			✓				
European developments	✓	✓		✓				✓	✓		✓				
Health and safety considerations			✓		✓	✓	✓	✓	✓		✓		✓	✓	✓
Equal opportunities issues	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

	Unit 53	Unit 54	Unit 60	Unit 61	Unit 62	Unit 63	Unit 64	Unit 65	Unit 66	Unit 67
Moral and ethical issues										
Social and cultural issues										
Environmental issues										
European developments				✓		✓	✓	✓	✓	✓
Health and safety considerations	✓			✓	✓	✓	✓	✓	✓	
Equal opportunities issues	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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