SUITE 2016

OCR
Oxford Cambridge and RSA

Cambridge **TECHNICALS LEVEL 3**

ENGINEERING

CAMBRIDGE TECHNICALS

DIPLOMA SUITE QUALIFICATION HANDBOOK

OCR Level 3 Cambridge Technical Foundation Diploma in Engineering (05824)
OCR Level 3 Cambridge Technical Diploma in Engineering (05825)
OCR Level 3 Cambridge Technical Extended Diploma in Engineering (05873)

First teaching from September 2016
Version 7 – March 2024

ocr.org.uk/engineering

About this handbook

The information we've provided in this handbook is correct at the time we produced it. Occasionally we may update it so please check the qualification webpage for the most up-to-date information.

Staff involved in delivering these qualifications must have access to and understand the requirements in this handbook.

For information on how to administer these qualifications please follow the link to the OCR Administration area. You'll find all the details about how the qualifications run, what you need to do and when. It covers everything from becoming an OCR centre, to making entries, claiming certificates, special arrangements and contacting us for advice.

About us

OCR is a leading UK awarding body and part of Cambridge University Press & Assessment.

We are a not-for-profit organisation so success is measured through the impact and reach of our activities and the scale of our contribution to helping people realise their aspirations.

We work in partnership with teachers, employers, higher education and government to develop general and vocational qualifications that will equip learners of all abilities, with the knowledge and skills they need to reach their full potential.

Thank you

We've worked with centres, employers and higher education institutions to design these qualifications.

Thank you to everyone who provided support and feedback as we developed the new Cambridge Technicals in Engineering. Particular thanks go to those of you who helped us shape these qualifications by so generously giving your own time to share your advice and experiences.

Releases of this handbook

For details of each of the releases see Appendix C

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1 Qualifications overview

Size and purpose at a glance

This suite is made up of five qualifications and they share some common units.

Units 1, 2, 3, 4, 23 and 24 are assessed by exam and marked by us. The remaining units are internally assessed by your centre staff and moderated by OCR.

OCR Level 3 Cambridge Technical Certificate in Engineering principles

180 GLH equivalent to one AS level in terms of size	• 3 x 60GLH units – all units externally examined	It will provide learners with the opportunity through applied learning to develop the core principles required in the engineering sector.

OCR Level 3 Cambridge Technical Extended Certificate in Engineering

360 GLH equivalent to one A level in terms of size	• 6 x 60 GLH units – at least four externally examined units and a choice of two further units, either examined or centre-assessed and moderated by OCR	It will provide learners with the opportunity through applied learning to develop the core specialist knowledge, skills and understanding required in the engineering sector.

OCR Level 3 Cambridge Technical Foundation Diploma in Engineering

540 GLH equivalent to one and a half A levels in terms of size	• 9 x 60 GLH units – at least three externally examined units and a choice of six further units, either examined or centre-assessed and moderated by us, which will make up a specialist endorsed pathway	Learners will be able to develop a foundation of the core knowledge, skills and understanding the engineering sector requires and develop further skills by completing a range of units through a choice of these specialist pathways: • Electrical and electronic engineering • Mechanical engineering and design • Automation, systems and control • Manufacturing.

OCR Level 3 Cambridge Technical Diploma in Engineering

720 GLH equivalent to two A levels in terms of size.	• 12 x 60 GLH units – at least four externally examined units and a choice of eight further units, either examined or centre-assessed and moderated by us, which will make up a specialist endorsed pathway	Learners will be able to develop the core knowledge, skills and understanding the engineering sector requires and to develop further skills by completing a wide range of units through a choice of these specialist pathways: • Electrical and electronic engineering • Mechanical engineering and design • Automation, systems and control • Manufacturing.

OCR Level 3 Cambridge Technical Extended Diploma in Engineering

1080 GLH equivalent to three A levels in terms of size	• 18 units in total • 13 x 60 GLH units, 1 x 90 GLH, 1 x 30 GLH are mandatory – at least five are externally examined units. • A choice of three further units, either examined or centre-assessed and moderated by us, which will contribute to a specialist endorsed pathway.	Learners will be able to develop the knowledge, skills and understanding the engineering sector requires and to develop further skills by completing a wide range of units through a choice of two specialist pathways: • Mechanical, Electrical and Electronic Systems Design and Engineering • Engineering Automation Control and Manufacturing Processes

You'll find the units and supporting documents for these qualifications on our website.

OCR Level 3 Cambridge Technical Foundation Diploma in Engineering at a glance

Qualification number	601/4600/X	**OCR Entry code**	05824
First registration date	01/09/2015	**Approved age range**	16–18, 19+
Guided Learning Hours (GLH)	540	**UCAS points**	You'll find further information on the UCAS website.
Total Qualification Time (TQT)	770	**Performance information**	See section 2 performance information.
Exam sessions each year	January and June	**Eligible for funding**	It's designed to meet the funding requirements of a 16–19 study programme.

Entry requirements	There are no formal entry requirements for this qualification. It is recommended that learners have, or are working towards, a grade 4/grade C or above in maths and English GCSEs.

This qualification has been designed	• for learners who are on a 16–19 study programme • to meet the Department for Education's characteristics for a Tech Level qualification.
This qualification is suitable for learners	• studying to prepare for employment in the engineering sector • who want to progress into engineering-related apprenticeships • who want to gain a Level 3 qualification to support further study in Further Education (FE) and Higher Education (HE) in engineering • studying for career development and who are already in employment.

Qualification structure	Learners must achieve a total of 9 units consisting of 3 mandatory examined units and 6 further units. The choice of units will depend on the specialist pathway selected.

Assessment method/model	Units 1 to 4 and Unit 23 are assessed by exam and marked by us. Your centre staff will internally assess all the other units and we will moderate them.
Grading	Examined units are graded Near-Pass, Pass, Merit and Distinction. Internally assessed units are graded Pass, Merit and Distinction. The qualification is graded PP, PM, MM, MD, DD, DD*, D*D*

Examination resits	Learners can resit an examined unit twice before they complete the qualification.
Repeat submission of learner's work	If you and the learner feel they haven't performed at their best during the assessment, the learner can, at your discretion, improve their work and resubmit it to you for assessment. You must follow our requirements on authenticity and feedback in section 8.

Employer engagement	It is a requirement that employers are engaged in the delivery of this qualification. Further information can be found in the individual units (where relevant) and in section 5.

Statement of purpose

Who is the OCR Level 3 Cambridge Technical Foundation Diploma in Engineering for?

This qualification is designed for learners aged 16 -19 years old who want to specialise in the engineering sector to enable them to undertake further study in engineering or go on to engineering-related apprenticeships or employment.

What does this qualification cover?

Learners can take up to two specialist pathways in this qualification depending on their choice of units. The pathways are:

- Electrical and electronic engineering
- Mechanical engineering and design
- Automation, systems and control
- Manufacturing.

Learners will cover nine topics; some are examined and some are tutor assessed.

All learners have to take Units 1 and 2. These enable them to demonstrate their understanding of the underpinning mathematics and scientific principles that are the foundation of engineering.

They then take one of two units (Units 3 or 4) to cover the principles of either mechanical or electrical and electronic engineering. These fundamental principles provide the foundation for practical application of this knowledge in their chosen pathway in this qualification and for further study.

Learners then choose six more units from a range of topics such as, electrical and electronic design, circuit simulation and manufacture, electrical devices and operations, automation and robotics, Computer Aided Design and Manufacturing (CAD and CAM), engineering and the environment and, mechanical simulation and modelling. This will increase the depth and breadth of their skills and knowledge.

Learners must take certain combinations of the units to lead to the awarding of a specific pathway. It's possible, through certain combinations, to have two pathways awarded.

This qualification will also enable learners to develop other desirable skills. Depending on their choice of optional units, these could include critical thinking, problem solving and creative thinking.

What could this qualification lead to?

It could lead to employment through an apprenticeship in engineering such as Higher Apprenticeships in Manufacturing Engineering, Power Engineering or Engineering Environmental Technologies.

It could also lead directly to employment in engineering roles: electrical and electronic engineering; mechanical engineering and design; automation, systems and control; and manufacturing.

As part of an academic study programme, it could also form part of the learner's basis for application to a higher education course in engineering, alongside complementary subjects, such as GCEs in maths and/or physics or other applied qualifications.

Is this qualification right for me?

This qualification is part of a suite of Cambridge Technicals in Engineering at Levels 2 and 3. Normally, learners would choose one of the OCR Level 3 Cambridge Technicals in Engineering because they have successfully gained Level 2 qualifications in a similar or related subject.

There are no formal entry requirements for this qualification, but, ideally, learners will typically have GCSEs at grade C or above including maths and English.

The Foundation Diploma is similar in size to one and a half A levels. The Foundation Diploma qualification will give learners a broad base of most fundamental principles of engineering and develop a range of practical engineering skills to prepare them for employment or to move onto an apprenticeship programme in that area. It will also prepare learners to study relevant engineering degrees in a HE institution

There are five sizes of qualification available in the OCR Level 3 Cambridge Technicals in Engineering suite:

- OCR Level 3 Cambridge Technical Certificate in Engineering
- OCR Level 3 Cambridge Technical Extended Certificate in Engineering
- **OCR Level 3 Cambridge Technical Foundation Diploma in Engineering**
- OCR Level 3 Cambridge Technical Diploma in Engineering
- OCR Level 3 Cambridge Technical Extended Diploma in Engineering

The Certificate is similar in size to an AS Level, if they were looking for a smaller qualification that could complement the main subjects in their study programme and prepare you for further study.

The Extended Certificate is similar in size to one A level and can be taken in one or two years. This gives learners the flexibility to take other qualifications, vocational or academic, to progress to a degree programme in HE or into employment where you could continue to study.

The Diploma is similar in size to two A levels, which gives learners the flexibility to take other qualifications, vocational or academic. The Diploma allows them to tailor their learning to a specific area in the engineering sector by selecting a specialist pathway (Electrical and Electronic Engineering, Mechanical Engineering and Design, Automation, Systems and Control or Manufacturing), to prepare them for employment or to move onto an apprenticeship programme in that area. It will also prepare learners to study relevant engineering degrees in a HE institution.

The Extended Diploma is a similar size to three A levels and can be taken in two years. This gives learners the breadth of engineering skills and knowledge to progress into employment where they could continue to study or a degree programme in HE. The Extended Diploma in engineering will form their complete study programme in preparation for progression into employment. The qualification will provide the subject specific skills, knowledge and understanding and a range of transferable skills that learners will require for employment in engineering roles such as electrical and electronic engineering; mechanical engineering and design; automation, systems and control; and manufacturing.

OCR Level 3 Cambridge Technical Diploma in Engineering at a glance

Qualification number	601/4599/7	**OCR Entry code**	05825
First registration date	01/09/2015	**Approved age range**	16–18, 19+
Guided Learning Hours (GLH)	720	**UCAS points**	You'll find further information on the UCAS website.
Total Qualification Time (TQT)	1030	**Performance information**	See section 2 performance information.
Exam sessions each year	January and June	**Eligible for funding**	It's designed to meet the funding requirements of a 16–19 study programme.

Entry requirements	There are no formal entry requirements for this qualification. It is recommended that learners have, or are working towards, a grade 4/grade C or above in maths and English GCSEs.

This qualification has been designed	• for learners who are on a 16–19 study programme • to meet the Department for Education's characteristics for a Tech Level qualification.
This qualification is suitable for learners	• studying to prepare for employment in the engineering sector • who want to progress into engineering-related apprenticeships • who want to gain a Level 3 qualification to support further study in Further Education (FE) and Higher Education (HE) in engineering • studying for career development and who are already in employment.

Qualification structure	Learners must achieve a total of 12 units consisting of 4 mandatory examined units and 8 further units. The choice of units will depend on the specialist pathway selected.

Assessment method/model	Units 1 to 4 and Unit 23 are assessed by exam and marked by us. Your centre staff will internally assess all the other units and we will moderate them.
Grading	Examined units are graded Near-Pass, Pass, Merit and Distinction. Internally assessed units are graded Pass, Merit and Distinction. The qualification is graded PP, PM, MM, MD, DD, DD*, D*D*

Examination resits	Learners can resit an examined unit twice before they complete the qualification.
Repeat submission of learner's work	If you and the learner feel they haven't performed at their best during the assessment, the learner can, at your discretion, improve their work and resubmit it to you for assessment. You must follow our requirements on authenticity and feedback in section 8.

Employer engagement	It is a requirement that employers are engaged in the delivery of this qualification. Further information can be found in the individual units (where relevant) and in section 5.

Statement of purpose

Who is the OCR Level 3 Cambridge Technical Diploma in Engineering for?

This qualification is designed for learners aged 16 -19 years old wanting to specialise in the engineering sector to enable them to undertake further study in engineering or to proceed into engineering-related apprenticeships or employment.

What does this qualification cover?

Learners can take up to two specialist pathways in this qualification depending on their choice of units. The pathways are:

Electrical and electronic engineering

Mechanical engineering and design

Automation, systems and control

Manufacturing.

Learners will cover 12 topics; some are examined and some are tutor assessed.

They take four mandatory units that will enable them to demonstrate their understanding of the underpinning mathematics and scientific principles of engineering, and the principles of mechanical and electrical/electronic engineering.

Learners then choose eight further units from a range of topics that have a more practical nature and will increase the depth and breadth of their skills and knowledge. These include electrical and electronic design, circuit simulation and manufacture, electrical devices and operations, automation and robotics, Computer Aided Design and Manufacturing (CAD and CAM), engineering and the environment, mechanical simulation and modelling, lean and quality, and materials science.

They must take certain combinations of the units to lead to the awarding of a specific pathway. It is possible through, certain combinations, to have two pathways awarded.

This qualification will also enable learners to develop other desirable skills. Depending on their choice of optional units these could include critical thinking, problem solving, and creative thinking.

What could this qualification lead to?

This qualification could lead to employment through an apprenticeship in engineering such as Higher Apprenticeships in Manufacturing Engineering, Power Engineering or Engineering Environmental Technologies.

It could also lead directly to employment in engineering roles in electrical and electronic engineering, mechanical engineering and design, automation, systems and control and manufacturing.

As part of an academic study programme, it could also form part of the learner's basis for application to a higher education course in engineering, alongside complementary subjects, such as GCEs in maths and/or physics or other applied qualifications.

Is this qualification right for me?

This qualification is part of a suite of Cambridge Technicals in Engineering at Levels 2 and 3. Normally, learners would choose one of the OCR Level 3 Cambridge Technicals in Engineering because they have successfully gained Level 2 qualifications in a similar or related subject.

There are no formal entry requirements for this qualification, but, ideally, learners will typically have GCSEs at grade C or above including maths and English.

Learners should take this Diploma to gain a broader understanding of the fundamental principles of engineering and to develop a wide range of practical engineering skills. It takes 720 guided learning hours (GLH) to deliver so it's a similar size to two A levels and can be taken in two years. This gives the learner some flexibility to take this qualification alongside complementary ones as part of a two-year study programme, whether vocational or academic, to prepare for further study or for moving to employment in the sector.

There are five sizes of qualification available in the OCR Level 3 Cambridge Technicals in Engineering suite:

- OCR Level 3 Cambridge Technical Certificate in Engineering
- OCR Level 3 Cambridge Technical Extended Certificate in Engineering
- OCR Level 3 Cambridge Technical Foundation Diploma in Engineering
- **OCR Level 3 Cambridge Technical Diploma in Engineering**
- OCR Level 3 Cambridge Technical Extended Diploma in Engineering

The Certificate is similar in size to an AS Level, if they were looking for a smaller qualification that could complement the main subjects in their study programme and prepare you for further study.

The Extended Certificate is similar in size to one A level and can be taken in one or two years. This gives learners the flexibility to take other qualifications, vocational or academic, to progress to a degree programme in HE or into employment where you could continue to study.

The Foundation Diploma is similar in size to one and a half A levels. The Foundation Diploma qualification will give learners a broad base of most fundamental principles of engineering and develop a range of practical engineering skills to prepare them for employment or to move onto an apprenticeship programme in that area. It will also prepare learners to study relevant engineering degrees in a HE institution

The Extended Diploma is a similar size to three A levels and can be taken in two years. This gives learners the breadth of engineering skills and knowledge to progress into employment where they could continue to study or a degree programme in HE. The Extended Diploma in engineering will form their complete study programme in preparation for progression into employment. The qualification will provide the subject specific skills, knowledge and understanding and a range of transferable skills that learners will require for employment in engineering roles such as electrical and electronic engineering; mechanical engineering and design; automation, systems and control; and manufacturing.

OCR Level 3 Cambridge Technical Extended Diploma in Engineering at a glance

Qualification number	603/0322/0	**OCR Entry code**	05873
First registration date	01/09/2016	**Approved age range**	16–18, 19+
Guided Learning Hours (GLH)	1080	**UCAS points**	You'll find further information on the UCAS website.
Total Qualification Time (TQT)	1540	**Performance information**	See section 2 performance information.
Exam sessions each year	January and June	**Eligible for funding**	It's designed to meet the funding requirements of a 16–19 study programme.

Entry requirements	There are no formal entry requirements for this qualification. It is recommended that learners have a grade 4/grade C or above in maths and English GCSEs.

This qualification has been designed	• for learners who are on a 16–19 study programme • to meet the Department for Education's characteristics for a Tech Level qualification.
This qualification is suitable for learners	• studying to prepare for employment in the engineering sector • who want to progress into engineering-related apprenticeships • who want to gain a Level 3 qualification to support further study in Further Education (FE) and Higher Education (HE) in engineering • studying for career development and who are already in employment.

Qualification structure	Learners must achieve a total of 18 units; 15 are mandatory and five of these are examined units. There is a choice, depending on the specialist pathway, of three further units which are either examined or centre-assessed and moderated by us.

Assessment method/model	Units 1 to 4, 23 and 24 are assessed by exam and marked by us. Your centre staff will internally assess all the other units and we will moderate them.
Grading	Examined units are graded Near-Pass, Pass, Merit and Distinction. Internally assessed units are graded Pass, Merit and Distinction. The qualification is graded PPP, MPP, MMP, MMM, DMM, DDM, DDD, D*DD, D*D*D, D*D*D*

Examination resits	Learners can resit an examined unit twice before they complete the qualification.
Repeat submission of learner's work	If you and the learner feel they haven't performed at their best during the assessment, the learner can, at your discretion, improve their work and resubmit it to you for assessment. You must follow our requirements on authenticity and feedback in section 8.

Employer engagement	It is a requirement that employers are engaged in the delivery of this qualification. Further information can be found in the individual units (where relevant) and in section 5.

Statement of purpose

Who is the OCR Level 3 Cambridge Technical Extended Diploma in Engineering for?

This qualification is for learners who are 16 years old or over and who want to specialise in engineering. This vocational qualification will help them to progress onto an engineering-related apprenticeship or employment within the engineering sector. This will also allow learners to progress onto a qualification in the same subject area at a higher level in Higher Education (HE).

What does this qualification cover?

There are two specialist pathways that learners can choose, depending on the career they wish to pursue which are:

- **Mechanical, Electrical and Electronic Systems Design and Engineering**
- **Engineering Automation Control and Manufacturing Processes**

Each pathway allows learners to study engineering in a context that enables them to learn and be assessed in ways that are practical and relevant to the engineering sector.

They will learn by applying their skills, knowledge and understanding such as mathematics and scientific principles of engineering, and the principles of mechanical and electrical/electronic engineering. The qualification will enable learners to acquire a range of transferable skills and knowledge which are highly regarded by employers and higher education providers. It will give learners an appreciation of what happens in the workplace and will also help to prepare them for employment in this sector.

Learners will be required to take 18 units. 15 units are mandatory, with 3 more optional units needed.

Everybody will take units on:

- Mathematics for Engineering
- Science for Engineering
- Principles of Mechanical Engineering
- Principles of Electronic and Electrical Engineering
- Project delivery for Engineering
- Promoting continuous improvement

For the Mechanical, Electrical and Electronic Systems Design and Engineering pathway, learners will take units on:

- Electrical and Electronic Design
- Circuit Simulation and Manufacture
- Electrical Devices
- Electrical Operations
- Mechanical Design
- Computer Aided Design
- Materials Science
- Mechanical Simulation and Modelling
- Mechanical Operations

For the Engineering Automation Control and Manufacturing Processes pathways, learners will take units on:

- Computer Aided Design
- Materials Science
- Mechanical Operations
- Automation Control and Robotics
- Electrical, Mechanical, Hydraulic and Pneumatic Control
- Systems and Programming
- Computer Aided Manufacture
- Lean and Quality
- Inspection and Testing

For the unit on Promoting continuous improvement, learners will draw on your skills, knowledge and understanding acquired through other units and apply what they have learned to Promoting continuous improvement; providing opportunities for synoptic assessment.

What could this qualification lead to?

This qualification is a similar size to three A levels and can be taken in two years. This gives learners the breadth of engineering skills and knowledge to progress into employment where they could continue to study or a degree programme in HE. The Extended Diploma in engineering will form their complete study programme in preparation for progression into employment. The qualification will provide the subject specific skills, knowledge and understanding and a range of transferable skills that learners will require for employment in engineering roles such as electrical and electronic engineering; mechanical engineering and design; automation, systems and control; and manufacturing.

- **Mechanical, Electrical and Electronic Systems Design and Engineering pathway** will lead to specific job roles such as: Mechanical technician, electrical/mechanical technician, electrical engineering technician.

- **Engineering Automation Control and Manufacturing Processes pathway** will lead to specific job roles such as: CAD/CAM technician, trainee CAD draughtsperson, maintenance technician.

Learners would take the Certificate, which is the same size as an AS Level, if they were looking for a smaller qualification that could complement the main subjects in their study programme and prepare you for further study.

The Extended Certificate is similar in size to one A level and can be taken in one or two years. This gives learners the flexibility to take other qualifications, vocational or academic, to progress to a degree programme in HE or into employment where you could continue to study.

The Foundation Diploma is similar in size to one and a half A levels. The Foundation Diploma qualification will give learners a broad base of most fundamental principles of engineering and develop a range of practical engineering skills to prepare them for employment or to move onto an apprenticeship programme in that area. It will also prepare learners to study relevant engineering degrees in a HE institution

The Diploma is a larger qualification, similar in size to two A levels, which gives learners the flexibility to take other qualifications, vocational or academic. The Diploma allows them to tailor their learning to a specific area in the engineering sector by selecting a specialist pathway (Electrical and Electronic Engineering, Mechanical Engineering and Design, Automation, Systems and Control or Manufacturing), to prepare them for employment or to

move onto an apprenticeship programme in that area. It will also prepare learners to study relevant engineering degrees in a HE institution.

Is this qualification right for me?

This qualification is part of a suite of Cambridge Technicals in Engineering at Levels 2 and 3. Normally, learners would choose one of the OCR Level 3 Cambridge Technicals in Engineering because they have successfully gained Level 2 qualifications in a similar or related subject.

There are no formal entry requirements for this qualification, but, ideally, learners will typically have GCSEs at grade C or above including maths and English.

There are five sizes of qualification available in the OCR Level 3 Cambridge Technicals in Engineering suite:

- OCR Level 3 Cambridge Technical Certificate in Engineering
- OCR Level 3 Cambridge Technical Extended Certificate in Engineering
- OCR Level 3 Cambridge Technical Foundation Diploma in Engineering
- OCR Level 3 Cambridge Technical Diploma in Engineering
- **OCR Level 3 Cambridge Technical Extended Diploma in Engineering**

2 About these qualifications

Introduction	This handbook contains what you need to know about the planning, delivery and assessment of these qualifications. Information about the administration of these qualifications, including an overview is available in the administration area on our website.
Qualification size	The size of the qualification is described in terms of Guided Learning Hours (GLH) and Total Qualification Time (TQT). GLH indicates the approximate time (in hours) that the learner will be supervised during any teaching, learning or assessment activities. We have worked with people who are experienced in delivering engineering qualifications to determine what content needs to be taught and how long it will take to deliver. TQT is comprised of two elements: GLH, and an estimate of the number of hours a learner will reasonably spend on any unsupervised learning or assessment activities (including homework) so they can successfully achieve their qualification. GLH and TQT for each qualification is given in the 'At a glance' table in section 1.
How does it fit into a 16–19 study programme?	The Foundation Diploma (540 GLH) is designed for learners who want to specialise in a particular vocational area. The programme could be taken over one or two academic years. The Diploma (720 GLH) is designed to be the substantive part of a 16–19 study programme. It can be complemented by other vocational or academic qualifications or non-qualification elements. (By non-qualification elements we mean tutorials, mentoring, work experience, sport, drama, extra-curricular activities, etc.). The Extended Diploma (1080 GLH) is designed to be a two year study programme. Its size means it's ideal for learners wanting a full-time course that specialises in the engineering sector and who intend to progress to full time employment. It can be complemented by non-qualification elements. You should make sure you tell learners the title and level of the qualification they've been entered for and that Oxford Cambridge and RSA Examinations (OCR) is the awarding body for their chosen qualification.

Is there a learner entry requirement?	No, to take these qualifications learners don't need any specific knowledge or skills related to the qualification. Learners should be aged 16 and over.
Do learners need specific prior learning?	No, but we do strongly recommend that they hold a Level 2 maths qualification, for example GCSE grade 4/grade C or above. However, this is at your discretion. It is also recommended that learners have, or are working towards, a grade 4/grade C or above in English GCSE We recommend you carry out an initial assessment to make sure learners are capable of reaching the required standards of the qualification they intend to work towards.
How are these qualifications delivered?	You're free to deliver these qualifications using any mode of delivery that meets the needs of your learners but you do have to involve employers in delivering and/or assessing them. Whichever mode of delivery you decide to use, you must make sure learners have appropriate access to the resources they will need to develop the skills, understanding and knowledge and to complete the assessments. We recommend you reference teaching and development of subject content and associated skills to real life situations, using appropriate work-based contacts, delivery personnel who are vocationally experienced and real-life case studies.
What are the requirements for employer involvement?	All learners must undertake meaningful activity involving employers during their study. For more information see 'Involving employers in teaching, learning and assessment' in section 5.
What are the subject knowledge requirements for our centre staff?	Tutors must have the relevant level of subject knowledge and skills to deliver these qualifications.
Are there specific resource requirements for my centre?	Yes, there are specific requirements for some units and we've detailed these in the individual units. For example, Unit 10 Computer Aided Design (CAD), you'll need to provide learners with access to CAD software. **Health and safety** Please also make sure your learners are provided with appropriate physical resources, such as protective equipment and/or clothing, wherever this is appropriate.

	You and your centre must take care and follow all health and safety requirements and quality assurance procedures specific to each practical activity. You must make sure the appropriate health and safety policies are in place for equipment used by learners, even if the equipment isn't specified in the unit content. **Assessment** Your centre must provide appropriate examination facilities for learners that comply with the Joint Council of Qualifications (JCQ) **Instructions for Conducting Examinations**.
How are these qualifications assessed?	These qualifications are assessed using a combination of: • external assessment, which we set and mark • internal assessment, where the tutor assesses learners' work which we externally moderate.
How are these graded?	Each examined unit achieved will be graded Near-Pass, Pass, Merit or Distinction. Each internally assessed unit achieved will be graded as Pass, Merit, or Distinction. Learners who don't achieve at least a Near-Pass or a Pass in a unit will be unclassified. A learner must get at least: • a Near-Pass for each examined unit, and • a Pass for each internally-assessed unit to be awarded the qualification they have entered for. Qualifications are graded using a Pass, Merit, Distinction, Distinction* (and Unclassified) structure. You'll find full details about the rules for achieving a qualification and about grading in section 10 'How to calculate the qualification grade'.

Availability and funding

These qualifications are designed to meet the funding requirements of a 16–19 study programme and 19–23 entitlement.

To check if these qualifications are approved for delivery and funding in your country you must visit the following websites for the latest information:

England

- Register of Regulated Qualifications – Ofqual's register of regulated qualifications
- Education and Skills Funding Agency for funding education and training for learners 14-19 years in England. This list was formerly known as the section 96.

Wales

- Qualifications in Wales database (QiW) - for information on approved and designated qualifications in Wales including funding

Northern Ireland

- Register of Regulated Qualifications – for England and Northern Ireland
- NIEFQAN – Approval of qualifications by the Department of Education in Northern Ireland
- Department for the Economy for public funding in Northern Ireland.

Use the Qualification Number (QN) when you're looking for information on qualification eligibility for public funding.

If you have any queries about funding for these qualifications email us at funding@ocr.org.uk.

Delivery in Wales and Northern Ireland

Learners in Wales and Northern Ireland shouldn't be disadvantaged by terms, legislation or aspects of government that are different from those in England.

Where such situations might occur, we've used neutral terms so learners may apply whatever is appropriate and current to their own situation.

Language

We will provide specifications, assessments and supporting documentation in English. Only answers provided in English will be assessed.

Performance information	We've designed these qualifications to meet the Department for Education requirements for qualifications in the Applied General category of the 16 to 19 performance tables. You'll find information on: • performance tables for England on the Department for Education website • performance points for Northern Ireland on the Department of Education website • performance measures for Wales on Qualifications in Wales database (QiW). If you have any queries about this performance information then please email ims@wales.gsi.gov.uk.
Are these qualifications recognised in the UCAS tariff tables?	Yes. You'll find further information on the UCAS website. It's always important for learners to check individual course requirements when applying to university.
Last entry date	These qualifications will continue to be available for entries and certification until we decide they need to be withdrawn. If we're going to withdraw a qualification we'll set an end date for entries and certification and we'll tell you what the arrangements are for the last date to enter learners and make claims for certificates. When we set end dates, you'll be able to see these on the Register of Regulated Qualifications and the Qualifications in Wales database (QiW). If an end date is not specified, it's because the qualification is still available.

3 Qualification resources, support and useful links

Our aim is to provide you with the information and support you need to deliver these qualifications.

Qualification resources available on Teach Cambridge

Delivery guide

Each unit delivery guide contains a range of lesson ideas with associated activities you can use with your learners. We've structured the guide by learning outcome so you can see how each activity helps learners cover the specification. The guide also explains key terms and common misconceptions.

Lesson elements

These are task sheets with accompanying teacher instructions. Each lesson element offers you a creative way of encouraging your learners to engage with the topic, with individual and group exercises, research activities and the opportunity to develop English and maths skills.

Resources links

For some of the units there is an e-resource that provides you with links to a range of teaching and learning websites and materials for each unit.

Skills guides

We've written skills guides for you and your learners'. They can help review or refresh skills in a variety of areas including:

- managing projects
- research
- referencing (good practice in acknowledging the work of other authors and avoiding accusations of plagiarism)
- command verbs
- examinations.

You can find these on the website under skills guides.

Project approach to delivery

A project delivery approach will be available for each pathway. These resources will show you how you can set an engineering project so that you can deliver the content in a holistic manner. The project approach is another way to involve employers in the delivery of these qualifications.

Qualifications calculator

This tool helps you and your learners to make sure that the right number and combination of units is chosen for a selected qualification/pathway.

Progress tracker

This tool helps you track your learners' progress through their chosen units.

Sample assessment materials

We only provide sample assessment materials for the externally assessed units. This is because we set the assessment for these units. Sample assessments show you what the assessment will look like, and you can use them as practice materials.

You can download sample assessment materials and past papers from our website.

Model assignments

We'll provide model assignments for mandatory internally assessed units. These can be:

- used as they are to assess your learners
- modified to suit your local or regional environment
- used as a guide to help you design your own assignments.

Assignment checking service

You can develop your own assessment for internally assessed units.

We provide an optional assignment checking service for Cambridge Technicals centres. If you use this service we'll check that the assignment you've designed covers the grading criteria in the unit and allows every learner to reach the highest grade if they demonstrate they have the associated level of knowledge, understanding and skills.

You can find more information about this service (including the price) on the Cambridge Technicals page.

Professional Development

We provide face-to-face courses and live online training events (webinars) where you can benefit from information, advice and guidance from subject experts and network with fellow professionals. We'll also produce presentations and films that provide detailed information and feedback about specifications, grading criteria and learner performance in past sessions.

Visit our website to find out about all our current courses and professional development.

Useful documents and links

Key OCR documents

Units

These are separate documents which you'll find on the qualification page of our website.

Candidate Authentication Statement for OCR Cambridge Technicals

Learners must sign this statement to confirm that the work they've submitted for assessment is their own. The form is completed when work is submitted for assessment and it can cover more than one unit. Every unit of the learner's qualification must be listed on a Candidate Authentication statement; there doesn't have to be a separate form for each unit.

Centre plan for Meaningful Employer Involvement

This plan must be completed to show how your centre will make sure every learner undertakes meaningful employer involvement while studying for these qualifications.

Unit Recording Sheets (URS)

You complete this form to record and justify your assessment decisions. You must fill in a URS for each unit a learner completes and make this available with the work during visiting moderation.

Witness Statement

You should use this form when you've observed a learner as part of their assessment. Use it to testify or corroborate what has actually been observed by you.

For more information, see 'Witness Statements' in section 8.

Useful links

OCR	What is malpractice? Administration information
JCQ	Access arrangements and reasonable adjustments Suspected Malpractice in Examinations and Assessments
Ofqual	Regulatory documents Register of Regulated Qualifications – for England and Northern Ireland
QiW	Qualifications in Wales database (QiW) - for information on approved and designated qualifications in Wales including funding
CCEA	CCEA website
Department of Education, Northern Ireland	Department of Education publications Performance measures /NI entitlement framework qualifications accreditation number (NIEFQAN) file

4 How these qualifications are structured

These qualifications are made up of units which can feature in one or more of the qualifications in the engineering suite.

You must consider the relationship between the mandatory units and the others when you plan the learning programme. We strongly recommend that learners achieve these units before being assessed in others. The content in mandatory Units 1 and 2 underpins the learning in other units (see Appendix B).

If learners choose optional units that are mandatory in another pathway it's possible for them to achieve two pathways in these qualifications. It's important that you and the learner think carefully about the choice of units.

Unit 25 should be taken as the final unit as learners will draw on their skills, knowledge and understanding acquired through other units and apply what they have learned.

When combining units for the chosen qualification, it's your responsibility to make sure the rules for the pathway are followed.

OCR Level 3 Cambridge Technical Foundation Diploma in Engineering (540 GLH)

For this qualification learners must achieve nine units and follow at least one endorsed pathway.

Learners can achieve two pathways in this qualification, depending on their choice of units.

Please note, it isn't possible to achieve two pathways for Electrical and Electronic Engineering with Mechanical Engineering and Design as this would require learners to complete 10 units.

If learners choose to take two pathways, they must make sure they meet the requirements of each pathway. We'll endorse their certificate with the pathways they've achieved.

Key

M = Mandatory unit	Learners must achieve all of these units
PO = Pathway optional unit	Learners must achieve at least one of these units
O = Optional unit	These units are optional and can be used towards the total required (9)
E = External assessment	We set and mark the exam
I = Internal assessment	You assessed this and we moderate it

Unit No	Unit title	Unit Ref No (URN)	How are they assessed?	Specialist pathways			
				Electrical and Electronic Engineering	Mechanical Engineering and Design	Automation, Systems and Control	Manufacturing
1	Mathematics for engineering	L/506/7266	E	**M***	**M***	**M***	**M***
2	Science for engineering	R/506/7267	E	**M***	**M***	**M***	**M***
3	Principles of mechanical engineering	Y/506/7268	E	O	**M***	**PO**	**PO**
4	Principles of electrical and electronic engineering	D/506/7269	E	**M***	O	**PO**	**PO**
5	Electrical and electronic design	Y/506/7271	I	**M***	O	O	O
6	Circuit simulation and manufacture	D/506/7272	I	**M***	O	O	O
7	Electrical devices	H/506/7273	I	**PO**	O	O	O
8	Electrical operations	K/506/7274	I	**PO**	O	O	O
9	Mechanical design	M/506/7275	I	O	**M***	O	O
10	Computer Aided Design (CAD)	T/506/7276	I	O	**M***	O	O
11	Materials science	A/506/7277	I	O	**PO**	O	O
12	Mechanical simulation and modelling	F/506/7278	I	O	**PO**	O	O

Unit No	Unit title	Unit Ref No (URN)	How are they assessed?	Specialist pathways			
				Electrical and Electronic Engineering	Mechanical Engineering and Design	Automation, Systems and Control	Manufacturing
13	Mechanical operations	J/506/7279	I	O	**PO**	O	O
14	Automation control and robotics	A/506/7280	I	O	O	**M***	O
15	Electrical, mechanical, hydraulic and pneumatic control	F/506/7281	I	O	O	**M***	O
16	Systems and programming	J/506/7282	I	O	O	**M***	O
17	Computer Aided Manufacturing (CAM)	L/506/7283	I	O	O	O	**M***
18	Lean and quality	R/506/7284	I	O	O	O	**M***
19	Inspection and testing	Y/506/7285	I	O	O	O	**M***
20	Business for engineering	D/506/7286	I	O	O	O	O
21	Maintenance	H/506/7287	I	O	O	O	O
22	Engineering and the environment	K/506/7288	I	O	O	O	O
23	Applied mathematics for engineering	R/506/7270	E	O	O	O	O

To achieve this qualification there's mandatory content in each specialist pathway that all learners must have successfully mastered. We've shown this content in the table above by an asterisk (*). Its contribution to the overall grade for each pathway is:

Electrical and Electronic Engineering

Mechanical Engineering and Design 55.5%

Automation, Systems and Control 55.5%

Manufacturing 55.5%.

You can download the units from our qualification webpage.

OCR Level 3 Cambridge Technical Diploma in Engineering (720 GLH)

For this qualification, learners must achieve 12 units and follow at least one endorsed pathway.

Learners can achieve two pathways in this qualification.

If learners choose to take two pathways, they must make sure they meet the requirements of each pathway. We'll endorse their certificate with the pathways they achieve.

Key

M = Mandatory	Learners must achieve all of these units
PO = Pathway optional	Learners must achieve at least one of these units within a chosen pathway
O = Optional	These units are optional and can be used towards the total required (12)
E = External assessment	We set and mark the exam
I = Internal assessment	You assessed this and we moderate it

Unit No	Unit title	Unit Ref No (URN)	How are they assessed?	Specialist pathways			
				Electrical and Electronic Engineering	Mechanical Engineering and Design	Automation, Systems and Control	Manufacturing
1	Mathematics for engineering	L/506/7266	E	**M***	**M***	**M***	**M***
2	Science for engineering	R/506/7267	E	**M***	**M***	**M***	**M***
3	Principles of mechanical engineering	Y/506/7268	E	**M***	**M***	**M***	**M***
4	Principles of electrical and electronic engineering	D/506/7269	E	**M***	**M***	**M***	**M***
5	Electrical and electronic design	Y/506/7271	I	**M***	O	O	O
6	Circuit simulation and manufacture	D/506/7272	I	**M***	O	O	O
7	Electrical devices	H/506/7273	I	**PO**	O	O	O
8	Electrical operations	K/506/7274	I	**PO**	O	O	O
9	Mechanical design	M/506/7275	I	O	**M***	O	O
10	Computer Aided Design (CAD)	T/506/7276	I	O	**M***	O	O
11	Materials science	A/506/7277	I	O	**PO**	O	O
12	Mechanical simulation and modelling	F/506/7278	I	O	**PO**	O	O
13	Mechanical operations	J/506/7279	I	O	**PO**	O	O
14	Automation control and robotics	A/506/7280	I	O	O	**M***	O

Unit No	Unit title	Unit Ref No (URN)	How are they assessed?	Specialist pathways			
				Electrical and Electronic Engineering	Mechanical Engineering and Design	Automation, Systems and Control	Manufacturing
15	Electrical, mechanical, hydraulic and pneumatic control	F/506/7281	I	O	O	**M***	O
16	Systems and programming	J/506/7282	I	O	O	**M***	O
17	Computer Aided Manufacturing (CAM)	L/506/7283	I	O	O	O	**M***
18	Lean and quality	R/506/7284	I	O	O	O	**M***
19	Inspection and testing	Y/506/7285	I	O	O	O	**M***
20	Business for engineering	D/506/7286	I	O	O	O	O
21	Maintenance	H/506/7287	I	O	O	O	O
22	Engineering and the environment	K/506/7288	I	O	O	O	O
23	Applied mathematics for engineering	R/506/7270	E	O	O	O	O

To achieve this qualification there's mandatory content in each specialist pathway that all learners must have successfully mastered. We've shown this content in the table above by an asterisk (*). Its contribution to the overall grade for each pathway is:

Electrical and Electronic Engineering 50%

Mechanical Engineering and Design 50%

Automation, Systems and Control 58.3%

Manufacturing 58.3%.

You can download the units from our qualification webpage.

OCR Level 3 Cambridge Technical Extended Diploma in Engineering (1080 GLH)

For this qualification, learners must achieve 18 units and follow at least one endorsed pathway.

Please note, it isn't possible to achieve two pathways. We'll endorse their certificate with the pathways they achieve.

Key

M = Mandatory	Learners must achieve all of these units
O = Optional	These units are optional and can be used towards the total required (18)
E = External assessment	We set and mark the exam
I = Internal assessment	You assessed this and we moderate it

Unit No	Unit title	Unit Ref No (URN)	How are they assessed ?	Specialist pathways	
				Mechanical, Electrical and Electronic Systems Design and Engineering	Engineering Automation Control and Manufacturing Processes
1	Mathematics for engineering	L/506/7266	E	**M***	**M***
2	Science for engineering	R/506/7267	E	**M***	**M***
3	Principles of mechanical engineering	Y/506/7268	E	**M***	**M***
4	Principles of electrical and electronic engineering	D/506/7269	E	**M***	**M***
5	Electrical and electronic design	Y/506/7271	I	**M***	O
6	Circuit simulation and manufacture	D/506/7272	I	**M***	
7	Electrical devices	H/506/7273	I	**M***	
8	Electrical operations	K/506/7274	I	**M***	
9	Mechanical design	M/506/7275	I	**M***	O
10	Computer Aided Design (CAD)	T/506/7276	I	**M***	**M***
11	Materials science	A/506/7277	I	**M***	**M***
12	Mechanical simulation and modelling	F/506/7278	I	**M***	
13	Mechanical operations	J/506/7279	I	**M***	**M***
14	Automation control and robotics	A/506/7280	I	O	**M***
15	Electrical, mechanical, hydraulic and pneumatic control	F/506/7281	I	O	**M***
16	Systems and programming	J/506/7282	I		**M***
17	Computer Aided Manufacturing (CAM)	L/506/7283	I		**M***
18	Lean and quality	R/506/7284	I		**M***
19	Inspection and testing	Y/506/7285	I		**M***
20	Business for engineering	D/506/7286	I	O	O
21	Maintenance	H/506/7287	I	O	O

Unit No	Unit title	Unit Ref No (URN)	How are they assessed ?	Specialist pathways	
				Mechanical, Electrical and Electronic Systems Design and Engineering	Engineering Automation Control and Manufacturing Processes
22	Engineering and the environment	K/506/7288	I	O	O
23	Applied mathematics for engineering	R/506/7270	E	O	O
24	Project management for engineers	T/615/1558	E	**M***	**M***
25	Promoting continuous improvement	A/615/1559	I	**M***	**M***

To achieve this qualification there's mandatory content in each specialist pathway that all learners must have successfully mastered. We've shown this content in the table above by an asterisk (*). Its contribution to the overall grade for each pathway is:

- Mechanical, Electrical and Electronic Systems Design and Engineering 83.3%
- Engineering Automation Control and Manufacturing Processes 83.3%

You can download the units from our qualification webpage.

5 Preparing for qualification delivery and assessment

Centre and centre assessor responsibilities

Before you plan to seek approval from us to offer these qualifications you must be confident your centre can fulfil all the responsibilities described below.

The quality of the delivery of teaching and the integrity of assessments and quality assurance is paramount. Systems have to be in place so that assessments are fair, valid, reliable, authentic and sufficient. One of the key factors behind valid, fair and reliable assessment is the expertise of those doing the assessment and internal quality assurance.

With this in mind here's a summary of the responsibilities that your centre and centre assessors **must** be able to fulfil:

- there are enough trained or qualified people to:
    - teach and assess the expected number of learners you have in your cohorts
    - internally standardise the number of assessors assessing units you offer
- all teaching staff have the relevant level of subject knowledge and skills to deliver the units you plan to offer and will fully cover the supporting knowledge, understanding and skills requirements for each unit
- any necessary resources are available for teaching and for assessment activities, to give learners every opportunity to meet the requirements of the unit and reach the highest grade possible
- there's a system of standardisation in place so that all assessment decisions for internally assessed units are consistent, fair, valid and reliable. (see centre standardisation in section 8)
- there's enough time for effective teaching, assessment and internal standardisation
- every learner undertakes meaningful activity involving employers while they're studying for their Cambridge Technical Foundation Diploma, Diploma or Extended Diploma in Engineering
- the OCR 'Centre plan for Meaningful Employer Involvement' is completed see 'Involving employers in teaching, learning and assessment' later in this section
- processes are in place to make sure that learners' work is authentic (see 'authenticity of learners' work' in section 8)
- any materials we provide for assessment of internally assessed units cannot be used for practice and then used again, without change, for summative assessment (see section 8)
- for internally assessed units you comply with our requirements for giving feedback to learners (see section 8)
- for internally assessed units that grades are correctly recorded in all records and accurately transcribed to the claim being submitted to us

- exams must be conducted so they comply with JCQ **Instructions for Conducting Examinations**
- a declaration is made at the point you're submitting any work to us for assessment that confirms:
    - all assessment is conducted according to the specified regulations identified in the Administration area
    - learners' work is authentic
    - grades have been transcribed accurately when completing our claim documentation
- centre records and learners' work is kept according to the requirements below:
    - learners' work must be kept until after their qualifications have been awarded and any appeals processed. We will not consider any appeals if the centre does not keep the work.
    - internal standardisation and assessment records must be kept securely for a minimum of three years after the date we've issued a certificate for a qualification.

Centre assessors, who are responsible for assessing learners' evidence for internally assessed units, must make sure that:

- learners understand what they need to do to meet the grading criteria and produce valid and sufficient evidence
- learners have access to the resources they need to meet the grading criteria and produce evidence
- any assessment guidance is referred to when making assessment decisions
- learners know they must comply with the Data Protection Act 2018 and the UK General Data Protection Regulation (GDPR) when they're producing work for assessment. Learners must not reference another individual's personal details in any evidence produced for summative assessment. It's the learner's responsibility to make sure evidence that includes another individual's personal details is anonymised
- learners' work is authentic
- the learner has completed a Candidate Authentication Statement which covers every unit
- they judge learners' work against the grading criteria we provide for the units
- they record their assessment decisions and justify the grade put forward for moderation using our unit recording sheet (URS) – we provide one for each unit
- they give an appropriate level of feedback to learners, and record what feedback has been given as part of the summative assessment
- they liaise with other assessors in the centre to make sure assessment decisions are to the required standard (see 'centre standardisation' in section 8)
- they confirm the unit grade for the learner after internal standardisation (assessors can let the learner know which grade has been given but that it can't be confirmed until after our moderation)

- all relevant evidence is present and reflects centre assessment decisions against the grading criteria (and the candidate authentication statement is available) before the unit is claimed.

Guidance for delivery

The guidance about how to deliver these qualifications isn't exhaustive. You should tailor your delivery so it meets the interests and needs of your learners and local and regional employers.

You're free to deliver these qualifications using any mode of delivery that meets the needs of your learners. Whichever mode you use, your learners must have appropriate access to the resources they need to complete their learning and carry out their assignments for assessment.

You should consider the learner's complete learning experience when you're designing learning programmes. These qualifications can be part of a 16–19 study programme and there'll be ways to integrate learning required for other qualifications or to develop and maintain the skills that are essential for further study and work. For example, we know it's important to keep developing English and maths skills after GCSE. We'll help you with your curriculum planning by signposting opportunities for English and maths skills practice in the delivery guides for each unit. You can access the delivery guides from the engineering qualification page of our website.

A project-based approach to teaching and learning is an ideal way to deliver these qualifications holistically and we will help you develop your approach through our resources. We've talked with centres who deliver our qualifications about the benefits of a project-based approach to learning. They've told us:

- it reinforces a synoptic application of skills and knowledge
- it's relevant to and reflective of work
- it makes the process of learning and application more meaningful and motivating.

We've designed these qualifications to facilitate this.

Involving employers in teaching, learning and assessment

We've worked with engineering businesses to make sure the learning is relevant for 18-year-olds who are going on to work in this sector.

It's essential that learners appreciate how the knowledge, understanding and skills they acquire are applied in the workplace. Involving employers also creates an engaging and motivating link to work. To this end, we will require you to involve employers in the teaching, learning and/or assessment when delivering these qualifications.

All learners must engage in activities related to learning and/or assessment where an employer has made a contribution to the activity. The employer must be directly involved in the engineering sector.

We don't prescribe the amount of employer involvement but it must be significant and by that we mean it must cover one or more elements of the qualification's mandatory content. You don't have to involve employers in the delivery or assessment of every mandatory unit; we recognise it may not be possible to do this.

We require you to complete a plan of how you will do this and to sign a declaration to confirm that every learner has had access to meaningful employer involvement. You must complete the OCR 'Centre plan for Meaningful Employer Involvement' and make this available at each moderation session. You will find the plan on the qualification page of the OCR website.

Your moderator will review and report on your completion of the 'Centre plan for Meaningful Employer Involvement'. We will impose sanctions if you don't secure meaningful employer involvement for every learner. This could mean you receive a written warning from us or, if the plan is not completed, result in us withdrawing your centre approval to deliver the Cambridge Technical Foundation Diploma, Diploma and Extended Diploma in Engineering.

Here are eligible activities all of which are capable of covering one or more elements of the mandatory content.

- We allow you to design your own assignments for summative assessment and you could involve employers to help identify a scenario on which to base the assignment – a context for carrying out tasks, creating requirements for a solution that's needed, identifying a problem to be solved – and the tasks to be completed.
- Employers could be involved in delivery such as teaching a master class in a specialist area. For example if the unit covers the use of smart and modern materials in engineering manufacture, an employer could talk about the materials they use, how and why they made their choices and the impact of using new materials. Or, employers could support delivery by providing information for teaching materials.
- While these qualifications don't call for work experience, there are practical elements in many of the internally assessed units that allow a learner to consolidate their learning and further develop their skills, knowledge and understanding if the work experience element of their study programme is directly relevant to their Cambridge Technical qualification. Work they undertake during work experience could contribute to the evidence for summative assessment. You must plan this with the learner and employer so the work allows the learner to cover the requirements of the unit and you're able to authenticate it. (Work experience only meets the requirement for employer involvement if it's relevant to their Cambridge Technical in Engineering.)
- Employers could act as an expert witness and comment on the learner's use of skills, knowledge and understanding to complete a task or tasks that contribute to the assessment of their performance. Witnesses must comment on what they've observed the learner doing. It's the responsibility of the centre assessor to assess if what the learner has done meets the requirements of the unit.

The following activities, while valuable and still worth arranging, are **not** considered as meeting the requirement:

- simulated or provider-based working environments, for example, small manufacturing units, car servicing facilities, salons and shops
- employers hosting visits, providing premises, facilities or equipment
- employers or industry practitioners providing talks or contributing to delivery on employability, general careers advice, CV writing or interview training
- learners going to career fairs, events or other networking opportunities
- employers providing learners with job references.

Important information on teaching content in units

(The use of i.e. / e.g. in teaching content)

The teaching content in every unit tells you what you have to teach to make sure learners can access the highest grades.

Anything which follows an i.e. details what you must teach as part of that area of content.

Anything which follows an e.g. is illustrative. Where we use e.g., learners must know and be able to apply relevant examples in their work, although these don't need to be the same ones specified in the unit content.

For internally assessed units you need to make sure that any assignments you create, or any modifications you make to an assignment, don't expect the learner to do more than they've been taught, but must enable them to access the full range of grades as described in the grading criteria.

For externally assessed units, where the content contains i.e. and e.g. under specific areas of content, we'll follow these rules when we set questions for an exam:

- we may ask a direct question about unit content that follows an i.e.
- where we show unit content as an e.g. a direct question will not be asked about that example. Any questions about the area of content will give learners the opportunity to provide their own examples as the unit has not specified which examples they should be familiar with.

Initial assessment of learners

It's important that you carry out an initial assessment to identify learners' levels of knowledge and understanding and any potential gaps that need to be addressed. This will also:

- help you and the learners to identify the most appropriate qualifications and optional units
- allow you to plan the assessment
- help learners understand the best place to start generating evidence.

Prior knowledge and experience

Of course, learners may have already gained a lot of relevant knowledge and experience that you should take into account. This is particularly relevant where they're studying part-time while in work.

Recognition of prior learning (RPL) is the process for recognising learning that never received formal recognition through a qualification or certification. This includes knowledge and skills gained in school, college or university and outside formal learning situations. Evidence can draw on any aspect of a candidate's prior experience including:

- domestic/family life
- education
- training

- work activities
- voluntary activities.

It's important you make it clear to learners that the RPL process is about how they've acquired the knowledge, understanding or skills; it doesn't mean they're exempt from the assessment. In no circumstance does the RPL process mean that any required qualification assessments can be avoided e.g. mandatory exams, practical/theory tests or assignments.

Evidence obtained through the RPL process must be assessed, to the same rigorous quality as evidence obtained through any other process.

RPL allows an individual to avoid unnecessary learning and we encourage the use of it in relation to the internally assessed units. Please let your learners know they can bring forward any relevant learning so it can be assessed against the grading criteria specified in the internally assessed unit(s) they aim to complete.

We ask you to judge the relevance of every aspect of a learner's prior learning (including how current and relevant it is) to the unit being assessed, before we moderate the assessment.

6 Synoptic assessment

Synoptic assessment is a feature of these qualifications and it requires learners to use an appropriate selection of their skills, knowledge and understanding, acquired through all of the units that make up their qualification, in an integrated way and apply them to a key task or tasks.

This helps learners to develop their appreciation and understanding of the connections between the different elements of learning in these qualifications to help make their curriculum meaningful and better prepare them for employment in the engineering sector.

Every engineer needs to have a good grasp of maths and science in the context of engineering and the learner will develop this knowledge and understanding in the mandatory units, Unit 1 Mathematics for engineering and Unit 2 Science for engineering.

These areas of learning will underpin the whole qualification – learners draw on the knowledge and understanding they've acquired through studying for Units 1 and 2, and apply it in their study and assessment for every other unit. For example, learners will need to apply mathematical techniques covered in Unit 1 as they study how to design components to be manufactured through Unit 9.

Of course, being able to apply knowledge and understanding in this way helps learners to develop their appreciation and understanding of the connections between the different elements of learning in these qualifications. You should encourage them to apply their learning across the qualification to help make their curriculum relevant and meaningful, and better prepare them to go on to employment or further study in engineering.

Every unit (except Units 1 and 2) will require the learner to apply knowledge from one or more of the mandatory units so that their ability to apply this knowledge synoptically can be assessed. That's why we strongly recommend that learners complete Units 1 and 2 before undertaking assessment in other units.

There'll be many opportunities for learners to use the knowledge, understanding and skills in an integrated way and apply aspects they've covered in one unit to other units they're studying. The sections below show how we formally assess synopticity. However, they by no means represent the full extent of the inter-connections that the learner can and should make between different units and areas of content in these qualifications. You'll find that no matter what optional units learners choose, they'll always draw on some fundamental knowledge and understanding from the mandatory units.

Synoptic assessment in externally assessed units 3,4 and 23

Ten per cent of the marks in each examination for Units 3, 4 and 23 will be allocated to synoptic application of knowledge. There'll be questions that draw on knowledge and understanding from Unit 1 Mathematics for engineering and/or Unit 2 Science for engineering that then has to be applied in the context of the unit being assessed.

For example, in the sample assessment material for Unit 23 Applied mathematics for engineering, Question 1(a) calls for the use of trigonometry from LO4 in Unit 1 Mathematics for engineering. In the sample paper, we've mapped this as such in the mark scheme.

In the centre-assessed units, there are times when learners have to apply their knowledge and/or understanding from mandatory units 1, 2, 3 or 4 (as relevant to the qualification size being studied). You'll see this synoptic assessment indicated with an asterisk (*), in the grading grid e.g. P1*.

For example, Unit 10 Computer Aided Design (CAD), Pass criterion P3* (Use mathematical calculation to solve reference geometry problems for use within the production of CAD models) requires the learner to use trigonometric techniques which have been studied in Unit 1 Mathematics for engineering.

Synoptic assessment in the Extended Diploma

In addition to the synopticity detailed above, all learners studying towards the Extended Diploma must take the mandatory Unit 25 'Promoting continuous improvement'. In this unit learners will reflect on a system, process or artefact that they produced during their study of the other units, and through the process of continuous improvement, plan and make improvements to it. To do this successfully they will have to draw on and use relevant skills, knowledge and understanding gained whilst studying the other units. Unit 25 therefore draws on and assesses learning from across the qualification and must therefore be assessed at the end of the learning programme.

7 External assessment

Summary of the externally assessed units

Unit 1 Mathematics for engineering	
60 GLH 1 hour 30 minutes written paper 60 marks OCR set and marked	• comprises short answer questions and questions requiring more extended responses • a formula booklet will be available for use with this unit • a scientific calculator may be used
Unit 2 Science for engineering	
60 GLH 1 hour 30 minutes written paper 60 marks OCR set and marked	• comprises short answer questions and questions requiring more extended responses • a formula booklet will be available for use with this unit • a scientific calculator may be used
Unit 3 Principles of mechanical engineering	
60 GLH 1 hour 30 minutes written paper 60 marks OCR set and marked	• comprises short answer questions and questions requiring more extended responses • a formula booklet will be available for use with this unit • a scientific calculator may be used
Unit 4 Principles of electrical and electronic engineering	
60 GLH 1 hour 30 minutes written paper 60 marks OCR set and marked	• comprises short answer questions and questions requiring more extended responses • a formula booklet will be available for use with this unit • a scientific calculator may be used
Unit 23 Applied mathematics for engineering	
60 GLH 2 hour written paper 80 marks OCR set and marked	• comprises short answer questions and questions requiring more extended responses • a formula booklet will be available for use with this unit • a scientific calculator may be used
Unit 24 Project management for engineers	
90 GLH 2 hour written paper 80 marks OCR set and marked	• comprises short answer and extended response questions based on an engineering project scenerio • a calculator may be used

There are two resit opportunities for each examined unit.

Learning Outcome weightings

Each Learning Outcome (LO) in an externally assessed unit is given a percentage weighting. This reflects the size and demand of the content you need to cover and its contribution to the overall understanding of the unit. You'll find the weightings for each LO in the externally assessed units.

How these units are assessed

These units are available as timetabled examinations. We set the dates.

Achievement at unit level is graded as Near-Pass, Pass, Merit or Distinction based on reaching the required grade boundary marks for each externally assessed unit. If a learner doesn't achieve the mark required for a 'Near-Pass' grade we'll issue an unclassified result for that unit.

We'll assess these qualifications in accordance with the Regulator's General Conditions of Recognition.

Your centre must provide appropriate assessment facilities for learners that comply with the JCQ Instructions for Conducting Examinations.

Availability of external assessment

There are two examination series each year in January and June. You can enter your learners for different units in different exam series. You'll find full details in the Administration area.

Resitting external assessment

Learners can resit an examined unit twice before they complete the qualification. We'll use the best unit result to calculate the certification result.

Your centre must make sure that when arranging resit opportunities you don't adversely affect other assessments being taken.

Arranging a resit opportunity is at your centre's discretion. You should only plan resits if it's clear the learner has taken full advantage of the previous assessment opportunity and formative assessment process.

Reporting suspected malpractice

For more information about suspected malpractice see section 8.

8 Internal assessment

Assignments for internal assessment

We recommend using assignments to assess learners for the internally assessed units.

An assignment has a set of related tasks with a common purpose or work-relevant reason for the learner to apply the knowledge, understanding and skills to achieve a unit. It acts as a stimulus to give learners the opportunity to generate evidence that meets the grading criteria.

The common purpose or work-relevant reason could be a scenario, a case study or brief that sets out the circumstances or reasons for completing the tasks. A scenario could describe the requirements for a solution to a problem (designing new components for domestic appliances using CAD) or a case study could be used to inform a proposal (a case study on transport methods used in an inner city to inform the design of sustainable transport systems).

You are free to create your own assignments to reflect the local or regional needs that are most relevant to your centre. There are more details in the next section.

We'll provide model assignments for the mandatory units that are internally assessed. Our model assignments can be:

- used as they are to assess your learners
- modified to suit your local or regional environment
- used as a guide to help you design your own assignments.

These qualifications are ideal for delivering through a project-based learning programme so you can carry the project-based approach through to the assessment.

Designing your own assignments for internally assessed units

We provide an assignment checking service for Cambridge Technicals centres. When you use this service, we check that the assignment you've designed covers the grading criteria in the unit and allows every learner to reach the highest grade if they demonstrate they have the associated level of knowledge, understanding and skills. You'll find details of how to request this service on the Cambridge Technicals page.

When designing assignments you must:

- write tasks in a way that makes it clear to the learner what they must do, don't structure tasks so they give step-by-step instructions, repeat the learning or themes of the learning, or be so prescriptive or detailed that they give the answer to the learner Tasks must allow the learner to decide how to approach the task (what they do in what order), meaning that they can apply their learning
- set tasks that reflect the command verbs used in the grading criteria. For example, where we ask for an evaluation the task you set must allow for a qualitative judgement to be made, taking into account different factors and using available knowledge, experience and evidence. There is a command verb glossary on the Engineering qualification page of our website.

- only specify the format of evidence when it's a requirement of the grading criteria or learning outcome. For example, for a unit on marketing where the grading criteria are about messaging, inference and persuasion in text you could ask learners to produce the content of a webpage rather than ask them to create a webpage itself
- avoid the need for excessive amounts of evidence. For example, a report can be a good way to pull together the evidence to meet several grading criteria
- make sure every learner is able to produce their own evidence. For example, if the task is to diagnose a fault in a piece of equipment and learners are given equipment to assess you have to be able to verify that the learner diagnosed the fault themselves. This could mean observing each learner or asking additional questions on how they made the diagnosis. The evidence produced will also need to demonstrate that this is what took place, through the use of witness statements, for example.
- tell learners how long they should expect to spend on each task. This is for guidance, learners must be allowed sufficient time to complete the tasks. The amount of time will vary depending on the nature of the tasks and the ability of individual learners.
- make sure every learner has access to appropriate resources to complete the tasks
- make every effort to make sure materials:
    - support equality and diversity in the language used, in the type of tasks set and in the scenarios provided
    - are free from discrimination and stereotyping of groups or individuals on the basis of, for example, gender, ethnicity, political beliefs, cultural background.

Finally, you don't have to set the same assignment for every learner in the cohort. If a learner has work experience that they can use to generate evidence towards some or all of a unit you can work with the employer to tailor an assignment and enable that to happen. You can also cover more than one unit in an assignment.

Assignments for practice

You **cannot** use assignments you're going to use for summative assessment as practice materials. (Summative assessment is the assessment of learning; it's a measure of a learner's achievement and you use it as the formal assessment of a learner's knowledge, understanding and skills.)

Changing the context of an assignment will help you to manage this. If a unit calls for the learner to do a cost analysis, a practice task will of course ask them to do this. If you've provided the data they need to analyse for practice then change the data for the summative assessment. If the learner has to generate data about a specific product before analysing it, then change the product to one that will generate different data.

Internal assessment and external moderation: a summary of how it works

The key features of assessment and moderation for the internally assessed units are:

- you can create assignments to assess your learners against the requirements of a unit
- where it's possible, assessors should draw on learners' work-based opportunities to generate evidence
- assessment of internally assessed units can take place at a time to suit you and your learners
- work for assessment is centre-assessed and assessment decisions are internally standardised within your centre
- your centre's assessment decisions are externally moderated by one of our visiting moderators.
- if your centre-assessed work doesn't meet the requirements determined by the learning outcomes and grading criteria of the unit(s), the unit grade(s) will be adjusted.

Your centre will need to identify staff that will act as centre assessors. They must have suitable subject knowledge and experience to be able to make judgements about learners' achievements against the grading criteria of the unit.

You must have an effective system set up for recording assessment decisions, including decisions made during internal standardisation. Assessors must record the feedback given to learners.

You should record your comments on the Unit Recording Sheets, which you can download from the qualification webpage.

You must make sure assessment records are fully auditable. Our moderator must be able to see, for each unit, evidence of:

- who assessed the learner
- what was assessed, i.e. the unit evidence
- when the assessment took place
- what feedback was given to the learner
- when centre assessment decisions were internally standardised and by whom
- what feedback was given to the assessor, including if they agree with the assessment decision or not (and why), as well as any action points that need addressing prior to submission for moderation and/or recommendations for future consideration.

Centre standardisation

If your centre has a number of staff acting as assessors for these qualifications, you **must** carry out internal standardisation to make sure all learners' work is assessed consistently to the required standard. We have a guide on how internal standardisation may be approached on our webpages for Cambridge Technicals.

If you're the only assessor in your centre for these qualifications, then it's still advisable to make sure your assessment decisions are internally standardised by someone else either in your centre or another centre. This should be someone who has experience of the nature of these qualifications (e.g. is delivering a similar qualification in another subject) or has relevant subject knowledge. You should ask them to review a sample of the assessments. Please note we are not able to provide information or contact details on centres offering these qualifications.

You must keep evidence of your internal standardisation in the centre for the moderator to see.

So there's a consistent approach to internal standardisation, you might decide to nominate an 'Internal Quality Assurer' (IQA).

Whoever is responsible for internal standardisation must make sure all assessors are assessing to the required standard and that all assessment decisions are fair, valid and reliable.

To do this they must:

- advise on interpretation of the standards, including feedback from previous assessments (where relevant)
- co-ordinate assessment practice
- provide advice and support to assessors
- monitor and observe assessment practice to make sure that all assessments are in line with the required standards
- sample assessments to confirm assessors' judgements across all units and all grades
- make sure feedback is given to all assessors and documented, e.g. records of feedback
- suggest ways in which assessment may be brought into line to meet the required standard
- check that all units and all grades have been included in internal standardisation
- maintain assessment documentation
- organise regular standardisation meetings/activities/events in your centre
- identify assessor development needs
- act as arbitrator for any disagreements in outcomes of assessments, including appeals.

Taking assignments and assessing learners' work

Learners can take assignments for internally assessed units at any time within the study programme. We can moderate your claims for internally assessed units when you're ready.

We'll arrange a date to visit that is suitable for both you and our moderator.

You must plan when you expect your learners to be ready for assessment. Learners can repeat an assignment if they have not performed at their best but you must use your discretion as to whether or not this is in their best interests. We strongly advise that you leave time in your planning in case an assignment needs to be repeated.

Authenticity of learners' work

Every learner must produce their own work independently. You must put in place appropriate mechanisms to make sure that you can be confident that the work you accept as evidence of a learner's achievement is their own.

You must:

- make sure learners and centre assessors understand what constitutes plagiarism and not accept plagiarised work as evidence
- be able to distinguish individual contributions from group work
- use supervision and questioning as appropriate to confirm authenticity
- make sure learners and centres assessors confirm the work is the learner's own.

Plagiarism

Work must be free from plagiarism. Plagiarism is the submission of someone else's work as your own and/or failure to acknowledge a source correctly. Plagiarism makes up a large percentage of cases of suspected malpractice reported to us by moderators. You must make sure you don't accept plagiarised work as evidence.

In line with the policy and procedures of JCQ on suspected malpractice, the penalties applied for plagiarism would usually result in the claim not being allowed.

Plagiarism often occurs innocently when learners don't know that they must reference or acknowledge their sources, or aren't sure how to do so. It's important to make sure your learners understand:

- the work they submit must be their own
- the meaning of plagiarism and what penalties may be applied
- that they can refer to research, quotations or evidence produced by somebody else but they must list and reference their sources
- quoting someone else's work, even when it's properly sourced and referenced, isn't an indication of understanding. The learner has to 'do' something with that information to show they understand. For example, if a learner has to analyse data from an experiment, quoting data doesn't show that they understand what it means. The learner has to interpret the data and, by relating it to their assignment, say what they think it means.

Group working

Your learners can work collaboratively or in groups to carry out work towards assessment tasks. However, you must make sure that each learner generates their own individual evidence to show they've met the grading criteria.

When working in a group all learners in the group should have a responsibility and/or a role that gives them the opportunity to generate individual evidence for assessment. For example, if the unit requires learners to plan the organisation of an activity this could be managed in a group discussion. The group discusses ideas for the activity, organisational requirements, roles and responsibilities to complete the activity, etc. All learners must show that they've the skill of planning so **all** members of the group must take part in the discussion. If three members of the group contributed to the discussion and one member took notes but did not contribute to the discussion, their note taking would **not** be considered a contribution towards planning.

Supervision

We recognise that you might not be able to invigilate or directly supervise every learner as they complete their assignment. Learners can complete their assignments in their own time, at the centre or at home. If you can't supervise, you must use enough checks so you're confident the learner's work is authentic. For example you can use questioning to confirm the depth and breadth of their understanding of the topic they've covered in a specific piece of work.

Use of questioning

Asking a learner questions will help you determine if the work is their own. If you haven't been able to supervise the learner, then asking questions, for example, about how they've done the work, what processes they went through to produce it and how they've related that to the assignment, should give you a clear indication as to whether or not they've done the work themselves.

Learner and centre declaration

All learners must complete a declaration to confirm that the work they've submitted is their own. **They must do this to cover every unit**. We provide a Candidate Authentication Statement for you to use for this purpose. You'll find it on our website.

We'll also ask you to confirm this declaration when making a unit claim.

Feedback to learners

You can discuss work-in-progress towards summative assessment with learners to make sure it's being done in a planned and timely manner. It also provides an opportunity for you to check the authenticity of the work. You must intervene if you feel there's a health and safety risk.

Feedback mustn't provide specific advice and guidance that would be construed as coaching as it would compromise the learner's ability to independently perform the task(s) they are doing and constitutes malpractice.

You can annotate your feedback on the learners' original work submitted for assessment or you can record it in your own separate document (whichever method you use it must be available to our moderator).

Your feedback should:

- be supportive, encouraging and positive
- inform the learner of what you've noticed, not what you think (for example if you have observed the learner completing a task you can describe what happened, what was produced and what was demonstrated).

Your feedback can:

- identify that the learner hasn't met the command verb. For example, 'This is only a description, not an evaluation'
- identify what area of work could be improved but not detail how to improve it. You can remind learners about what they were taught but not how to apply it to improve the work.

Your feedback must not:

- be so detailed that it provides a step-by-step guide on what to do
- coach the learner on how to achieve or complete the task
- provide detail on where to find information/evidence.

In other words, your feedback mustn't tell the learner what they need to do to improve their work. The learner needs to think how to apply their learning and your feedback. You mustn't do the work for them.

Taking an assignment for summative assessment

You must provide your learners with the relevant resources they need to do the assignment. This could include:

- specialist equipment
- software
- people/participants
- practical space.

When learners are working on their evidence you can ask questions about what they're doing to encourage them, make sure they understand what the tasks are and check they're making progress. You can't tell them how to complete the tasks in a way that would be tantamount to doing the work for them. You mustn't coach learners when they're doing their assignment for assessment, as this would give them an unfair advantage. Please see the previous section 'Feedback to learners'.

You should set a realistic date for submitting the assignment, having considered the purpose of the unit and how that might affect timescales. We don't specify what the submission time for the assignment should be – we think it's best to leave this decision to your professional judgement.

What evidence is needed to assess a learner?

The learner's evidence should be in an appropriate format to demonstrate their skills and application of knowledge and understanding as specified in the grading criteria for a unit.

You should discuss with learners what the most suitable sources of evidence are. It isn't the quantity of the evidence they've produced that's important - it's the quality and breadth, that they've produced it themselves, and that it meets the grading criteria.

Evidence could be written work, audio/visual recordings, digitally formatted documents, a product or photographs of the product.

Evidence can come from a number of sources. The main ones are:

- outcomes of assignments, tasks or work-based activities (through projects or real work)
- observation of practice
- responses to questions
- witness statements.

Learners should make sure their work is clearly presented, referenced and ordered to help in the assessment.

The same evidence can contribute to more than one unit as long as it clearly meets the relevant grading criteria. For moderation it must be clear which part of that evidence meets each unit.

Learners mustn't reference another individual's personal details in any evidence produced for summative assessment. It's the learner's responsibility to make sure evidence that includes another individual's personal details is anonymised to comply with the Data Protection Act 2018 and the UK General Data Protection Regulation (GDPR).

Witness statements

Witness statements can be a useful way of providing supporting evidence where a skill is being used which isn't easily represented in portfolio evidence. They're supplementary evidence of what the learner has done and are to be used in conjunction with other evidence. For example, a witness statement could support evidence of a learner delivering a presentation alongside the actual presentation and speaker notes.

Witness statements should be suitably detailed, for each learner, to enable the centre assessor and our moderator to determine if the grading criteria have been met. You should use the witness statement template available on our website.

Assessing work for (summative) assessment

Once your learners have completed everything they need to do for their assignment, they must submit their work to you to be assessed. You must be convinced, from the evidence presented, that learners can work independently to the required standard.

You must judge or 'mark' the work against the grading criteria for the unit and identify a grade. Please annotate the work to show where the evidence indicates they've achieved the grading criteria. Your centre must internally standardise the assessment decisions for the cohort and do this before you give feedback to the learner.

When you're confident the learner has demonstrated that they've met all the requirements of the unit, for at least a pass grade, you can submit a claim to us for moderation.

You mustn't add, amend or remove any work after it's been submitted to us for final assessment.

Resubmitting work for (summative) assessment

If you and the learner feel they haven't performed at their best during the assessment, the learner can, at your discretion, improve their work and resubmit it to you for assessment. You must be sure it's in the learner's best interests to re-attempt the assessment.

You should set a realistic date for the resubmission of work having considered the purpose of the unit and what the learner intends to improve. You must record the reasons why you've allowed them to resubmit in your centre's assessment decision records. You must also follow our guidelines on giving feedback and record the feedback you give them on the original work. We monitor the assessment decisions you make.

You mustn't encourage multiple re-submissions of work. Re-submission at the centre assessment stage is intended to allow the learner to reflect on feedback and improve, but not to be an iterative process where they make small modifications through on-going feedback to eventually achieve the desired level.

Reporting suspected malpractice

It is the responsibility of the Head of Centre[1] to report all cases of suspected malpractice involving centre staff or candidates. A JCQ Report of Suspected Malpractice form (JCQ/M1 for candidate suspected malpractice or JCQ/M2 for staff suspected malpractice) is available to download from the JCQ website and should be completed as soon as possible and emailed to malpractice@ocr.org.uk.

When asked to do so by OCR, Heads of Centres are required to investigate instances of malpractice promptly and report the outcomes to OCR.

More information about reporting and investigating suspected malpractice and the possible sanctions and penalties which could be imposed, is contained in the JCQ Suspected Malpractice Policies and Procedures document available from the JCQ website. Centres may also like to refer to the OCR Website for more details.

[1] This is the most senior officer in the organisation, directly responsible for the delivery of OCR qualifications, e.g. the Head Teacher or Principal of a school/college. The Head of Centre accepts full responsibility for the correct administration and conduct of OCR exams

9 External moderation

An OCR visiting moderator externally moderates your assessment decisions. You have the choice of virtual or face-to-face moderation visits.

For details about moderation visits refer to the Administration area.

External moderation makes sure centres have made the correct assessment decisions. Our moderator will confirm or adjust the grade you've given to a learner's work and provide feedback to you on the decisions they've made.

External moderation of a centre's assessment decisions is achieved through systematic sampling of the work submitted for moderation. The outcome of the sampled moderation will apply to all learners' work submitted for that unit in the claim.

Your centre can have up to two moderation opportunities per academic year (subject to centre activity). We can arrange additional chargeable moderation sessions – for more details refer to the Administration area.

On the basis of the sample taken, our moderator will either **agree** in the main with your centre's assessment decisions or **disagree** with them in relation to particular units.

If the decision is **agree**, your centre's assessment decisions for all learners' work entered for moderation on that occasion, i.e. in the single claim submitted for moderation, will be confirmed by our moderator once moderation is completed.

If the decision is **disagree**, our moderator will provide feedback to your centre. Disagreement is usually down to one of the following:

- work doesn't meet the required standard for the grading criteria claimed by the centre
- assessment in the sample is inconsistent
- some evidence is missing or hasn't been cross-referenced to the grading criteria, so our moderator can't find it
- there's no evidence of assessment having taken place.

Our moderator will prepare a full report that will include comments on the accuracy of assessment and centre actions, if appropriate, for future assessments.

Where the moderator confirms the assessment decisions, they'll submit the claims to us for processing.

10 How to calculate the qualification grade

Grading

Centre-assessed units

These units are assessed by your centre and externally moderated by us.

Each unit has specified grading criteria for Pass, Merit and Distinction.

A summative unit grade can be awarded at Pass, Merit or Distinction:

- to achieve a 'Pass' a learner must have satisfied **all** the 'Pass' grading criteria
- to achieve a 'Merit' a learner must achieve **all** the 'Pass' grading criteria and **all** the 'Merit' grading criteria
- to achieve a 'Distinction' a learner must achieve **all** the 'Pass' grading criteria and **all** the 'Merit' grading criteria and **all** the 'Distinction' criteria.

If a learner doesn't meet all the 'pass' grading criteria, we issue an unclassified result for that unit.

Externally assessed units

We mark and assess all externally assessed units. We mark each one according to a mark scheme, and the mark will determine the grade awarded ('Near-Pass, 'Pass', 'Merit' or 'Distinction'). We determine grade boundaries for each of the externally assessed units each assessment series. If a learner doesn't achieve the mark required for a 'Near-Pass' grade, we issue an unclassified result for that unit.

Qualification

We grade the overall qualification using a structure of Pass, Merit, Distinction, Distinction*. For these qualifications the qualification grade awarded will be a combination of two grades e.g. Merit Pass (see 'Qualification grade tables' later in this section). Learners who don't achieve the required units will be unclassified.

If a learner resits an examined unit or resubmits an internally assessed unit, we use the best unit results to calculate the overall grade to make sure they get the best possible grade for their full qualification.

We'll print the pathways achieved on learners' full qualification certificates.

Calculating the qualification grade

To be awarded a full qualification, **a learner must achieve the units required for the qualification with at least:**

- **a Near-Pass grade for the externally assessed units**
- **a Pass grade for all the internally assessed units.**

If they don't do so, they won't be awarded the qualification.

Learners will be awarded a combination of Pass, Merit, Distinction or Distinction* qualification grades determined by the aggregation of points gained through the successful achievement of individual units.

The number of points available for each unit depends on the unit grade achieved.

Points available for unit grade achieved

You'll find details of unit GLH in 'How these qualifications are structured' in section 4.

The table below shows the number of points issued for each grade.

Unit GLH	**Points table for units based on GLH**				
	Near pass (R)*	Pass	Merit	Distinction	unclassified
30	N/A	7	8	9	0
60	12	14	16	18	0
90	18	21	24	27	0

* Near-Pass (R) grade is issued, at unit level, for learners who narrowly miss a Pass on externally assessed units.

To calculate the learner's qualification grade

You will need to add up all the points for the units the learner has achieved, making sure they've covered the appropriate mandatory content, taken sufficient externally assessed units, and any units required for the chosen pathway.

Having calculated the total number of points based on the unit grades you'll check this figure in the qualification grade table, for the relevant qualification, to identify the overall qualification grade. If a learner doesn't achieve the lowest points score required for the qualification, we issue an unclassified result.

Example A
Learner A has taken the units required for the Foundation Diploma and pathways:

- Manufacturing
- Electrical and Electronic Engineering.

The calculation would be:

Unit	Grade	Number of points
1	Pass	= 14 points
2	Merit	= 16 points
4	Distinction	= 18 points
5	Merit	= 16 points
6	Pass	= 14 points
7	Merit	= 16 points
17	Merit	= 16 points
18	Pass	= 14 points
19	Merit	= 16 points
	Total number of points	= 140 points

In this example, Learner A has an overall qualification grade of a Merit Merit.

Example B

Learner B has taken the units required for the Foundation Diploma with one pathway, Mechanical Engineering and Design.

The calculation would be:

Unit	Grade	Number of points
1	Distinction	= 18 points
2	Unclassified	= 0 points
3	Merit	= 16 points
9	Merit	= 16 points
10	Merit	= 16 points
11	Merit	= 16 points
12	Pass	= 14 points
13	Pass	= 14 points
19	Merit	= 16 points
	Total number of points	= 126 points

In this example, while Learner B has enough points to be eligible for a Pass Pass, they wouldn't be awarded it because they haven't achieved at least a Near-Pass for Unit 2, an unclassified result would be issued.

Example C

Learner C has taken the units required for the Foundation Diploma with one pathway, Mechanical Engineering and Design.

The calculation would be:

Unit	Grade	Number of points
1	Pass	= 14 points
2	Near-Pass	= 12 points
3	Merit	= 16 points
9	Merit	= 16 points
10	Merit	= 16 points
11	Merit	= 16 points
12	Pass	= 14 points
13	Pass	= 14 points
19	Merit	= 16 points
	Total number of points	= 134 points

In this example, Learner C has an overall qualification grade of a Merit Pass.

Qualification grade table
OCR Level 3 Cambridge Technical Foundation Diploma (540 GLH)

The table below shows the points ranges and the grades that those ranges achieve.

Points range	Grade	
156 and above	Distinction* Distinction*	D*D*
153 – 155	Distinction* Distinction	D*D
150 – 152	Distinction Distinction	DD
144 – 149	Distinction Merit	DM
138 – 143	Merit Merit	MM
132 – 137	Merit Pass	MP
108 – 131	Pass Pass	PP
Below 108	Unclassified	U

Qualification grade table
OCR Level 3 Cambridge Technical Diploma (720 GLH)

The table below shows the points ranges and the grades that those ranges achieve.

Points range	Grade	
208 and above	Distinction* Distinction*	D*D*
204 – 207	Distinction* Distinction	D*D
200 – 203	Distinction Distinction	DD
192 – 199	Distinction Merit	DM
184 – 191	Merit Merit	MM
176 – 183	Merit Pass	MP
144 – 175	Pass Pass	PP
Below 144	Unclassified	U

Qualification grade table
OCR Level 3 Cambridge Technical Extended Diploma (1080 GLH)

The table below shows the points ranges and the grades that those ranges achieve.

Points range	Grade	
312 and above	Distinction* Distinction* Distinction*	D*D*D*
308 – 311	Distinction* Distinction* Distinction	D*D*D
304 – 307	Distinction* Distinction Distinction	D*DD
300 – 303	Distinction Distinction Distinction	DDD
292 – 299	Distinction Distinction Merit	DDM
284 – 291	Distinction Merit Merit	DMM
276 – 283	Merit Merit Merit	MMM
268 – 275	Merit Merit Pass	MMP
260 – 267	Merit Pass Pass	MPP
216 – 259	Pass Pass Pass	PPP
Below 216	Unclassified	U

11 Certificate and results

Claim a qualification

For the internally assessed units, there are no specific deadlines for claiming the units. However, it's important to make claims only when you're confident the learner has met the requirements for the unit.

For examined units, the assessment is time-tabled and we'll issue results according to the schedule given in the Administration area.

We can only award a qualification and issue a certificate for it once the learner has achieved all the units required for the qualification they've been entered for.

You shouldn't make a claim unless, in the final opinion of your centre, the evidence meets the requirements for certification.

Certificates

We'll put the regulated qualification titles and numbers on learners' certificates.

We'll issue a certificate confirming achievement of the qualification directly to your centre for successful learners. This is an automated process, you don't need to claim or 'cash-in' a full qualification.

Unit certificates will not be issued as standard; however, a unit certificate can be requested by the centre. The unit certificate will be free of charge providing it is claimed within 2 years (24 months) of the learner being entered for the qualification.

If a learner can't complete the full qualification you can print a candidate achievement report showing individual unit results, from OCR Interchange, or you can make a specific request for unit certificates.

Refer to the Administration area, certificates, for full details.

Replacement certificates

For details on replacement certificates refer to the Administration area, certificates.

Review of results

Under certain circumstances, you may wish to query the result(s) issued to one or more learners.

To find out more about this, please refer to the JCQ **Post-Results Services** document and the Administration area, post results services.

12 Administration and other information

For information on how to administer these qualifications please follow the link to OCR's Administration area.

You'll find all the details about how the qualifications run, what you need to do and when. It covers everything from becoming an OCR centre, to making entries, claiming certificates, special arrangements and contacting us for advice.

Collecting evidence of learner performance to ensure resilience in the qualifications system

Regulators have published guidance on collecting evidence of learner performance as part of long-term contingency arrangements to improve the resilience of the qualifications system. You should review and consider this guidance when delivering these qualifications to learners at your centre.

For more detailed information on collecting evidence of learner performance please visit our website.

Avoidance of bias

We've taken great care in preparing these qualifications to avoid bias of any kind. We've given special focus to the eight strands of the Equality Act with the aim of making sure both direct and indirect discrimination are avoided.

Accessibility

There can be adjustments to standard assessment arrangements on the basis of the individual needs of learners.

It's important that you identify as early as possible whether learners have disabilities or particular difficulties that will put them at a disadvantage in the assessment situation and choose a qualification or adjustment that allow them to demonstrate attainment.

The responsibility for providing adjustments to assessment is shared between your centre and us. Please read the JCQ document Access Arrangements, Reasonable Adjustments.

If you have learners who need a post-examination adjustment to reflect temporary illness, indisposition or injury at the time the assessment was taken, please read the JCQ document **A guide to the special consideration process**

There's more guidance on access arrangements and special consideration on OCR Administration, preparation.

If you think any aspect of these qualifications unfairly restricts access and progression, please email or call our Customer Support Centre.

13 Contacting us

Feedback and enquiries

We aim to provide consistently great customer service and your feedback is invaluable in helping us to achieve our goal. For questions about our qualifications, products and services, please contact the Customer Support Centre. To leave your feedback on the OCR website, people and processes please use our feedback form.

Telephone: 01223 553998
Email: support@ocr.org.uk

You could also visit OCR's website for more information about our qualifications.

Complaints

We are committed to providing a high quality service but understand that sometimes things can go wrong. We welcome your comments and want to resolve your complaint as efficiently as possible. To make a complaint please follow the process set out on our website.

Appendix A Performance descriptors

The performance descriptors indicate the level of attainment associated with Pass, Merit and Distinction grades at Level 3.

They are for use in developing units and assessment criteria, setting assessment materials and in determining grade boundaries (where applicable) at awarding meetings. They give a general indication of the levels of attainment likely to be shown by a representative learner performing at these boundaries.

The descriptors must be interpreted in relation to the content in the units and the qualification as a whole; they are not designed to define that content. The grade awarded will depend, in practice, on the extent to which the learner has met the learning outcome(s) overall. Shortcomings in some aspects of the assessment may be balanced by better performance in others.

Level 3 Pass

At Pass, learners show sound knowledge of the basic elements of the content being assessed, but find further development and application of their understanding to some more complex problems or less familiar contexts difficult. The most fundamental practical skills are executed effectively but lack refinement, producing functional outcomes.

Learners will be able to:

- recall, select and apply knowledge of aspects of engineering and present information using basic engineering terminology, showing some understanding
- recognise some of the mathematical and scientific facts, concepts and techniques that are needed and select appropriate techniques to use in some contexts
- distil some of the essential information from engineering situations and scenarios provided to them, and use their knowledge of engineering principles to solve basic engineering problems
- plan and carry out investigations and tasks safely, using practical skills in a range of engineering contexts (e.g. design, production, maintenance) to produce effective outcomes with limited assistance
- review evidence and draw conclusions, making suggestions for improvement where applicable.

Level 3 Merit

At Merit, learners show good knowledge and understanding of many elements of the content being assessed, and can regularly apply their understanding to different situations and problems. Some higher order tasks involving detailed explanation, evaluation and analysis may be accessed less readily. Practical skills are more developed than at Pass both in terms of range and quality and generally lead to outcomes that are of good quality as well as being functional.

Learners will be able to:

- recall, select and apply knowledge and understanding of aspects of engineering, and present information clearly, using a good range of engineering terminology

- recognise most of the mathematical and scientific facts, concepts and techniques that are needed and usually select appropriate concepts and techniques to use in a variety of contexts
- distil much of the essential information from engineering situations and scenarios provided to them, apply relevant knowledge and show some understanding to solve engineering problems
- apply knowledge, understanding and engineering principles to plan and carry out investigations and tasks safely, using practical skills with precision in a range of engineering contexts (e.g. design, production, maintenance) to produce high quality outcomes with minimal guidance
- analyse and evaluate evidence, make judgements and draw appropriate conclusions
- adapt their approach and suggest appropriate improvements based on evidence.

Level 3 Distinction

At Distinction, learners show thorough knowledge and understanding of many elements of the content being assessed, and apply their understanding to increasingly advanced and complex situations and problems. Detailed explanation, evaluation and analysis are undertaken. A wide range of practical skills including more advanced techniques are demonstrated independently, and any end products are of very high quality in terms of both function and form.

Learners will be able to:

- recall, select and apply knowledge and understanding of aspects of engineering, and present detailed information clearly, using an extensive range of engineering terminology
- recognise almost all of the mathematical and scientific facts, concepts and techniques that are needed, and usually select the most appropriate concepts and techniques to use in a wide variety of contexts
- distil all of the essential information from engineering situations and scenarios provided to them, and apply relevant knowledge and understanding to solve increasingly complex engineering problems
- apply knowledge, understanding and engineering principles to plan and carry out investigations and tasks safely and precisely, demonstrating advanced practical skills in a range of engineering contexts (e.g. design, production, maintenance) to confidently and independently produce outcomes of very high quality
- critically analyse and evaluate evidence, making reasoned judgements and drawing perceptive conclusions
- demonstrate adaptability in their approach both during and after tasks, suggesting justified improvements based on evidence and experience.

Appendix B Opportunities for applying learning across units

Unit:	Links to unit and Learning Outcome (LO):	
5	2	LO3: Understand fundamental scientific principles of electrical and electronic engineering
	4	LO1: Understand fundamental electrical principles LO2: Understand alternating voltage and current LO4: Understand power supplies and power system protection
6	2	LO3: Understand fundamental scientific principles of electrical and electronic engineering
	4	LO1: Understand fundamental electrical principles
7	2	LO3: Understand fundamental scientific principles of electrical and electronic engineering
	4	LO1: Understand fundamental electrical principles LO6: Understand digital electronics
8	2	LO3: Understand fundamental scientific principles of electrical and electronic engineering (resistance and Ohm's Law)
	4	LO1: Understand fundamental electrical principles LO4: Understand power supplies and power system protection
9	1	LO6: Be able to apply statistics and probability in the context of engineering problems
10	1	LO4: Be able to use trigonometry in the context of engineering problems (Angles, radians, arcs, circles and sectors all relevant here)
11	2	LO4: Understand properties of materials
12	2	LO2: Understand fundamental scientific principles of mechanical engineering
	3	LO1: Understand systems of forces and types of loading on mechanical components LO3: Understanding levers, pulleys and gearing LO2: Understand fundamental geometric properties
13	1	LO1: Understand the application of algebra relevant to engineering problems (transposition of formulae)
14	1	LO6: Be able to apply statistics and probability in the context of engineering problems
15	2	LO5: Know the basic principles of fluid mechanics
16	1	LO1: Understand the application of algebra relevant to engineering problems
	4	LO6: Understand digital electronics
17	1	LO4: Be able to use trigonometry in the context of engineering problems
18	1	LO6: Be able to apply statistics and probability in the context of engineering problems
19	2	LO4: Understand properties of materials (basic material properties)
		LO4: Understand properties of materials (what is meant by the terms non-destructive testing and destructive testing)
20	1	LO6: Be able to apply statistics and probability in the context of engineering problems
21	1	LO6: Be able to apply statistics and probability in the context of engineering problems
22	1	LO6: Be able to apply statistics and probability in the context of engineering problems
24		See unit for more information as there is coverage across units 1, 18, 20 & 21
25		See unit for more information as there is coverage across most units.

Appendix C Key updates to this handbook

Section	Title of section	Change	Versions and Date
12	Collecting evidence of learner performance to ensure resilience in the qualifications system – new section added	New section added	Version 7 March 2024
Throughout		Hyperlinks updated	Version 6 January 2023
9	External moderation	Added - You have the choice of virtual or face-to-face moderation visits.	
Throughout		Hyperlinks updated	Version 5 May 2021
2	Availability and Funding	Updated information and hyperlinks	
3	Qualification resources, support and useful links	Updated information about Skills Guides, the assignment checking service and Professional Development. Removed reference to the Online Community	
5 and 8	Centre and centre assessor responsibilities Internal assessment and external moderation: a summary of how it works	Reference to the Data Protection Act updated	
10	Contacting OCR	Contact details updated	
All sections		Refreshed all hyperlinks.	Version 4 April 2020
3	Qualification resources, support and useful links	Updated section about Professional Development , removing reference to CPD Hub	
1	Qualifications at a glance	Updated sections to reflect the introduction of: • the near-pass unit grade for examined units • the unit point values for the near-pass grade • the new minimum number of points required for the qualification grade at Pass. • the additional resit opportunity for examined units	Version 3 December 2018
7	Summary of the externally assessed units, How these units are assessed, Resitting external assessment		
10	Externally assessed units, Qualification, Calculating the qualification grade, Qualification Grade tables		

All sections		Added the OCR Level 3 Cambridge Technical Extended Diploma in Engineering (1080 GLH) qualification. The structure is described in full in section 4. There are two new units for the Extended Diploma: Unit 24 Project management for engineers (externally assessed) Unit 25 Consolidating engineering practice (Internally assessed)	Version 2 August 2016
1	Qualification overview	Now includes: • Size and purpose at a glance • Qualification at a glance	
2	Qualification size	Information about Total Qualification Time (TQT)	
	How are these qualifications assessed?	Updated information	
	Funding	Updated information and links	
3	MAPS (Managed Assessment Portfolio System)	Removed	
4	How these qualifications are structured	Added 1080 structure	
5	Preparing for qualification delivery and assessment Involving employers in teaching, learning and assessment Prior knowledge and experience	Updated information	
6	Synoptic assessment	Updated information	
8	Internal assessment	Updated information and added Reporting suspected malpractice	

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