

Moderators' report

CAMBRIDGE TECHNICALS LEVEL 3 (2016)

ENGINEERING

**OCR Level 3 Cambridge Technical
in Engineering Principles**

Certificate: 05822

**OCR Level 3 Cambridge Technical
in Engineering**

Extended Certificate: 05823

Foundation Diploma: 05824

Diploma: 05825

Extended Diploma: 05873

Summer 2025 series

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Introduction

Our Moderators' reports are produced to offer constructive feedback on centres' assessment of moderated work, based on what has been observed by the moderation team. These reports include a general commentary of accuracy of internal assessment judgements, identify good practice in relation to evidence collation and presentation and comment on the quality of centre assessment decisions against individual Learning Objectives. The report also highlights areas where requirements have been misinterpreted and provides guidance to centre assessors on requirements for accessing higher mark bands. Where appropriate, the report will also signpost other sources of information that centre assessors will find helpful.

OCR completes moderation of centre-assessed work in order to quality assure the internal assessment judgements made by assessors within a centre. Where OCR cannot confirm the centre's grades, we may adjust them in order to align them to the national standard. Any adjustments to centre grades can be viewed on the Interchange claim once processed by the moderator. Centres should also refer to their individual centre report provided after moderation has been completed. In combination, these centre-specific documents and this overall report should help to support centres' internal assessment and moderation practice for future series.

Online courses

We have created online courses to build your confidence in delivering, marking and administering internal assessment for our qualifications. Courses are available for Cambridge Nationals, GCSE, A Level and Cambridge Technicals (2016).

Cambridge Nationals

All teachers delivering our Cambridge Nationals suite are asked to complete the Essentials for the NEA course, which describes how to guide and support your students. You'll receive a certificate which you should retain.

Following this you can also complete a subject-specific Focus on Internal Assessment course for your individual Cambridge Nationals qualification, covering marking and delivery.

GCSE, A Level and Cambridge Technicals (2016)

We recommend all teachers complete the module on Online courses – NEA for their subject. These courses provide subject-specific information about course content; how to prepare for planning, marking and submitting; and support with understanding the marking criteria.

Accessing our online courses

You can access all our online courses from our teacher support website [Teach Cambridge](#).

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These self-paced online courses are intended for any teachers. During the course, you will engage with interactive content on subjects such as guidance on unit content, structure and administrative processes.

If you have any queries, please contact our Customer Support Centre on 01223 553998 or email support@ocr.org.uk.

General overview

It is important that centres and their allocated moderators liaise early in the year to discuss potential visit dates and agree deadlines for candidate evidence to be completed and entered for moderation. The centres should enter candidates through OCR Interchange within the timeline requirements (at least 10 working days before planned moderation date). This will allow moderators to select a centre sample, and to support with the time needed by centres to upload the required candidate's evidence. Centres also should be aware of the requirements to upload all selected candidates' evidence onto the OCR secure exchange portal at least three days before planned moderation date; this enables moderators to carry out checks before their visits, if visit is virtual. OCR will also set up a Teams meeting link for the virtual moderation which the moderator will send to the centre. If visits are in person, again candidates should be entered onto Interchange at least five days before the visit and all samples and associated paperwork made available on the visit day.

OCR has produced a number of guidance documents relating to the uploading of candidate evidence and URS onto OCR secure exchange system, which centres should refer to.

[Visiting moderation](#)

At each visit, centres are required to provide a complete Unit Recording Sheet (URS) for each candidate that clearly shows where the candidate has gained each grading criteria along with the final grade that is entered on Interchange. The URS should also include clear page referencing to show where work against the particular grading criteria has been awarded. This can be supported with suitable annotation in the candidate's portfolio. The URS should also be uploaded onto the OCR secure exchange portal before the virtual moderation date.

Internal Verification and Standardising

Centres are encouraged to conduct Internal Verification (IV) of assignment briefs or tasks, if they are set by centre. They should also conduct Internal Standardisation when assessing candidates' evidence (OCR has produced sample documents that the centres could use). Where this has been carried out in centres it clearly demonstrated consistent and accurate assessment of candidate evidence and helped in the moderation process. Remember, the IV document is intended as feedback to the assessor on the assessment of a candidate's evidence.

Meaningful Employer Involvement

This is a requirement from DfE for all awarding bodies 'to confirm that providers have secured employer involvement for every learner' taking a Tech level qualification or a Technical Certification qualification that has been approved by DfE. This refers to all Cambridge Technical qualifications except (05823) at both Levels 2 and 3. The employer involvement does not contribute to the overall qualification grading, but it is a requirement that all learners must met.

Authentication

It is important that each candidate provides a completed authentication statement for their work and understands the importance of authenticity in the evidence they are presenting. Centres only need to supply one authentication statement per candidate covering all units they are submitting.

Referencing

All candidates must be encouraged to reference their work. This could be as simple as footnotes on each page showing the source material used along with numbered annotation within the work which should reference to particular grading criteria covered by candidate's evidence. Optional layout feature, use this to draw particular **attention to a point** in the content, can be used in **any section** throughout the report.

Assessment for learning



Centres are encouraged to use witness statements to support candidates work - noting that these cannot be used as a single source of evidence against grading criteria. An example of where this is effective is in Unit 13 when using a range of hand tools safely and effectively (P5). [Witness statements](#) can be used to support and corroborate evidence such as confirming safe and independent working. Witness statements should be individualised and referenced to candidate.

Comments on individual units

Unit 5 – Electrical and Electronic Design

Candidates were able to demonstrate general understanding of electrical and electronic principles through well designed centre assignments. Candidates need to clearly show their understanding of Kirchhoff's Laws and how to apply the laws effectively. Power supply circuit schematics were also well presented and detailed from those that met this criteria.

There are a number of synoptic assessment links to Units 2 and 4 which are referenced in the grading criteria and must be clearly demonstrated in candidate evidence. All grading criteria must be clearly shown in candidate evidence.

Unit 6 – Circuit Simulation and Manufacture

Candidates sampled during this moderation period have presented photographic evidence and screen shots of their work with descriptive annotation or clear step by step description to meet the grading criteria. This is an effective method due to the practical nature of the unit requiring circuit simulation and manufacture.

The use of a Witness Statement to support candidate's evidence is helpful and can cover most practical activities related to the unit grading criteria to further corroborate candidate generated evidence.

To allow candidates to gain marks and understanding for fault-finding (Learning Outcome 4) centres could provide a number of alternative faulty circuits that allow candidates to demonstrate different fault-finding techniques and test equipment options.

Unit 7 – Electrical Devices

This unit is often used as an extra unit for the Diploma and Extended Diploma qualifications. Candidates who completed this unit, used photographic evidence with clear description of operation of various devices to meet grading criteria. Candidates need to make sure that all evidence is clearly referenced, and information sources clearly identified.

Within this unit there is a synoptic link to Unit 4 which should be explicit with calculations related to potential divider or bridge circuits.

Unit 8 – Electrical Operations

There was a range of evidence across all the criteria provided by candidates for this unit. There was clear demonstration of their understanding, with use of tables and images of electronic components and devices with descriptions. Centres must remind candidates that their evidence for items they explain must be supported with technical data and/or referenced to the source they used.

The use of annotated photographs supported Learning Outcomes 2, 3 and 4. These could be explained in more detail with references to what is being done, why, etc. This unit can also be supported with Witness Statements to corroborate candidate activities, etc.

Unit 9 – Mechanical Design

From the samples submitted for this unit, candidates provided a range of diagrams and drawings in 2D, and 3D format to demonstrate their understanding of this unit's requirements. Some centres should look extend both 2D and 3D drawings with wider detail to fully address LO1 criteria. Candidates also supplied explicit evidence to meet synoptic evidence required for P7.

(Within this unit there is a synoptic link to Unit 1.)

Centres must encourage candidates to make sure that all their formal drawings use British Standard conventions where possible. There is no need for candidates to show every drawing they have created but a number to clearly show their design ideas. Candidates should also clearly define their understanding of DFMA principles.

Unit 10 – Computer Aided Design (CAD)

This is the most used unit for all qualifications across all centres. The centres have used various CAD software packages to allow candidates to produce evidence that meets all grading criteria.

Candidates have presented images with descriptions to demonstrate their practical use of CAD features.

Final drawings should enable the component or product to be manufactured and must be to BS and ISO drawing standards.

Centres should encourage candidates to extend their research base to show wider understanding of simulation tools within CAD systems and support assessing the advantages and disadvantages of these tools in assisting with engineering design.

Unit 11 – Material Science

This unit is often presented in the form of written reports using centre set tasks for each LO. Candidates should be encouraged to use more supporting images across the LOs and clearly reference all research sources. The testing of materials evidence could be enhanced using a Witness Statement which would support annotated photographic evidence presented by candidates.

(Within this unit is a synoptic link to Unit 2.)

Unit 12 – Mechanical Simulation and Modelling

This Unit can be linked to Unit 10 CAD. The CAD drawings can be extended or used as a base to show details required to address this unit's LO criteria. Candidates must demonstrate a clear understanding of FEA and CFD simulation and apply them to a component or product (taken from Unit 10). The use of mathematical, scientific and engineering principles to prove the accuracy of FEA and CFD system does require explicit detail for P5 and P8 as these are the synoptic links.

Unit 13 – Mechanical Operations

Annotated photographic evidence is used by most centres to address the LO criteria. Centres also used Witness Statements to cover practical activities. Candidates also created production plans which contained various topic headings (tooling, equipment, H&S requirements, etc.) which could be related to grading criteria. (Within this unit there is a synoptic link to Unit 1.) Risk assessments were also within candidate samples; these could be more explicitly linked to planning.

Unit 14 – Automation Control and Robotics

This unit continues to be delivered by only a small number of centres, mainly due to the resources required to deliver the unit and allow candidates to achieve all grading criteria. Candidates used research material which was clearly referenced and identified to produce evidence for the Merit and Distinction criteria. Candidates need to develop and present good analytical skills to produce evidence for the Merit and Distinction criterion.

Unit 15 – Electrical, Mechanical, Hydraulic and Pneumatic Control

As with Unit 14, Unit 15 is only delivered by a small number of centres, again due to the resources required to deliver the unit and enable candidates to achieve all grading criterion. Candidates used research material, this was referenced and identified for the evidence for the Merit and Distinction criteria. Candidates should be encouraged to develop analytical skills to produce evidence for the Merit and Distinction criterion.

This unit requires candidates to research and develop their knowledge of the operation and control of electrical, mechanical, hydraulic and pneumatic system and present their findings related to the grading criterion. In most cases this was through reports which included images, photos and description of the systems.

Unit 16 – Systems and Programming

This unit is usually submitted from centres delivering the Diploma and Extended Diplomas. Work sampled was presented in various formats which included written programs (ladder diagrams), photographic and explanation records, related to the specific grading criteria. Candidates should be encouraged to show more extended detail/responses for the Merit and Distinction criteria with more in-depth explanations and evaluations.

Candidates provided programs for PLC and other embedded devices in a control system.

Unit 17 – Computer Aided Manufacture (CAM)

For this unit candidates addressed assessed criteria well across the samples moderated. Candidates should be encouraged to reference risk assessments within plans. The Distinction criteria from some centres would benefit from more detail of analysis of CAD CAM for D1. D2 could benefit from link to real world products compared against candidates' CNC product to extend evaluation of CAM effectiveness.

D3 would benefit from wider supporting research, images etc related to advanced applications. This unit can also be supported with the use of Witness Statements.

(Within this unit there is a synoptic link to Unit 1.)

Unit 18 – Lean and Quality

For this unit candidates have presented evidence through research, evaluation and analysis of lean waste manufacturing techniques, quality control in manufacturing and the creation of a production plan for a manufactured component, taking into account lean and quality principles.

Candidates need to clearly reference their evidence to each grading criteria and present separate evidence for each grading criteria. (Within this unit there is a synoptic link to Unit 1.)

Unit 19 – Inspection and Testing

This unit is used by centres delivering the Diploma and Extended Diploma. Candidates have presented evidence for this unit through research, evaluation and analysing of inspection and testing techniques. Candidates produced a testing schedule for the production of a product (this is shown from a centre through evidence from a visit to a local manufacturing company where candidates observed the testing process in action).

Candidates find difficulty in producing SPC moving range charts from data. Centres are allowed to give candidates data in this instance for the candidates to present evidence that meets grading criteria.

(Within this unit there is a synoptic link to Unit 2.)

Unit 20 – Business for Engineering

For this unit candidates produce evidence through research, evaluation and analysing of various factors that affect engineering businesses. Research base and links with companies could support/extend the detail for some of the Merit and Distinction criteria. Explanations and assessment details would benefit from wider research.

Candidates do have some difficulty in creating a budget related to an engineering department that contains all relevant information for the Distinction grade, they could refer to local companies and make sure all key terms and explanations are within candidates' evidence (Learning Outcome 5).

(Within this unit there is a synoptic link to Unit 1.)

Unit 21 – Maintenance

Only a small number of centres delivered this unit, those delivering the Diplomas. Candidates use a variety of formats to address the criteria. Annotated photos are used to document to practical elements; candidates should make sure all processes are shown within these annotated images. For the Merit criteria, there should be explicit evidence of the relevant manuals used for maintenance operations along with supporting photos of following these schedules. Adaptations of maintenance plans should also be explicit. Most centres used this unit to support their MEI with local companies and enhance the candidates' learning experience related to this unit.

This unit could be supported with the use of Witness Statement, particularly when on placement.

(Within this unit there is a synoptic link to Unit 1.)

Unit 22 – Engineering and the Environment

Candidates have presented evidence for this unit through research and evaluation. Candidates need to clearly reference their evidence and match it to the grading criteria and identifying the research sources. Candidates should extend their research base, particularly for P7, the work of the environment agency, and include a wider range of relevant supporting images across all LOs. All terminologies used within the unit must be clearly explained by candidates. Candidates should provide an in-depth analysis of environmental impact on global manufacturing and how it could be reduced.

(Within this unit there is a synoptic link Unit 1.)

Unit 25 – Promoting Continuous Improvement

This unit is related to personal development and candidates can relate evidence from other units to show actions or developments they have made to their personal and practical skills. The units being used must be clearly identified. Self-evaluation and justification of actions are required to be shown by candidates. Commentaries should be specific not generic, and candidates should present evidence in the singular, not 'we' or 'us'.

Supporting you

Teach Cambridge

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Don't have access? If your school or college teaches any OCR qualifications, please contact your exams officer. You can [forward them this link](#) to help get you started.

Reviews of marking

If any of your students' results are not as expected, you may wish to consider one of our post-results services. For full information about the options available visit the [OCR website](#).

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Free for all OCR centres with an Interchange account, it allows unlimited users per centre. We require an [Interchange](#) username to verify your centre's users for ExamBuilder.

If you do not have an Interchange account, please contact your centre administrator (usually the Exams Officer) to request a username.

Once you have an Interchange username, use the form on [this page](#) to sign up for ExamBuilder, or ask an existing user at your centre to create an ExamBuilder account for you.

Online courses

Enhance your skills and confidence in internal assessment

What are our online courses?

Our online courses are self-paced eLearning courses designed to help you deliver, mark and administer internal assessment for our qualifications. They are suitable for both new and experienced teachers who want to refresh their knowledge and practice.

Why should you use our online courses?

With these online courses you will:

- learn about the key principles and processes of internal assessment and standardisation
- gain a deeper understanding of the marking criteria and how to apply them consistently and accurately
- see examples of student work with commentary and feedback from OCR moderators
- have the opportunity to practise marking and compare your judgements with those of OCR moderators
- receive instant feedback and guidance on your marking and standardisation skills
- be able to track your progress and achievements through the courses.

How can you access our online courses?

Access courses from [Teach Cambridge](#). Teach Cambridge is our secure teacher website, where you'll find all teacher support for your subject.

If you already have a Teach Cambridge account, you'll find the link to the **Online courses** under the **Assessment** or **Training** tab – hover over **Assessment** or **Training** on the horizontal menu and select **Online courses** from the dropdown.

If you don't have a Teach Cambridge account yet, ask your exams officer to set you up – just send them this [link](#) and ask them to add you as a Teacher.

Access the courses **anytime, anywhere and at your own pace**. You can also revisit the courses as many times as you need.

Which courses are available?

We recommend all teachers complete the module on Online courses – NEA for their subject. These courses provide subject-specific information about course content; how to prepare for planning, marking and submitting; and support with understanding the marking criteria.

The subject-specific courses are tailored for each qualification that has non-exam assessment (NEA) units, except for AS Level and Entry Level. They cover the following topics:

- the structure and content of the NEA units
- the assessment objectives and marking criteria for the NEA units
- examples of student work with commentary and feedback for the NEA units
- interactive marking practice and feedback for the NEA units.

We are also developing courses for some of the examined units, which will be available soon.

How can you get support and feedback?

If you have any queries, please contact our Customer Support Centre on 01223 553998 or email support@ocr.org.uk.

We welcome your feedback and suggestions on how to improve the online courses and make them more useful and relevant for you. You can share your views by completing the evaluation form at the end of each course.

Tell us what you think

Your feedback plays an important role in how we develop, market, support and resource qualifications now and into the future. We want you and your students to enjoy and get the best out of our qualifications and resources, but to do that we need your honest opinions to tell us whether we're on the right track or not.

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