NQ Verification 2013–14

Key Message Reports

Verification group name:	Engineering Science
Levels	N4 and N5
Date published:	July 2014

This Report combines all Verification Key Messages for the academic session 2013-14.

NQ Verification 2013–14
Key Messages Round 1

01 Section 1: Verification group information

Verification group name:	**Engineering Science**
Verification event/visiting information	**Event**
Date published:	**January 2014**

National Courses/Units verified:

National 4 – Engineering Contexts & Challenges (H23A 74)
National 4 – Electronics & Control (H23B 74)
National 4 – Mechanisms & Structures (H23D 74)
National 5 – Engineering Contexts & Challenges (H23A 75)
National 5 – Electronics & Control (H23B 75)
National 5 – Mechanisms & Structures (H23D 75)

02 Section 2: Comments on assessment

A range of assessment approaches were observed, including use of the SQA-produced Unit assessment support pack 2 (Unit by Unit approach) and Unit assessment support pack 3 (combined approach).

A number of centres also devised their own instruments of assessment. However, it must be said that, where a centre's own instrument is used, care must be taken to ensure that each of the Assessment Standards is cross-matched with the evidence to ensure full Unit coverage. As such, it is recommended that centres take advantage of SQA's prior verification facility, details of which can be found at http://www.sqa.org.uk/sqa/63004.html.

To aid the verification process, centres should ensure that administrative paperwork related to their own assessments is clear, well laid out and in a simple-to-read format. It is recommended that the Assessment Standard number and result are recorded next to the evidence used for the centre's assessment decision.

Assessment judgements

Where Unit assessment support packs were used by centres, national standards were largely applied and there were only a small number of issues — these mainly came from a misinterpretation of the information in the 'judging evidence' tables.

Where centres use the Unit assessment support packs, they should ensure that the current version is used (available from the secure area of SQA's website). The use of draft versions led to some issues with regards to making assessment decisions.

Where centres are devising their own instruments of assessment, and they vary considerably from the Unit assessment support packs, centres are advised to use SQA's prior verification service. Otherwise, centres should ensure that all assessment instruments provide full coverage of all of the Assessment Standards.

03 Section 3: General comments

As verification rounds progress, exemplification of good practice in the subject will be identified and will be posted on SQA's website. Centres are advised to use advice given here to aid their own practice.

It was noted that a number of centres had no evidence of internal verification practice. In addition to being a requirement of offering SQA qualifications, internal verification policies are an essential quality assurance tool that will result in an early resolution of many assessment issues.

NQ Verification 2013–14
Key Messages Round 2

01 Section 1: Verification group information

Verification group name:	**Engineering Science**
Verification event/visiting information	**Event**
Date published:	**March 2014**

National Courses/Units verified:

National 4 – Engineering Contexts & Challenges (H23A 74)

National 4 – Electronics & Control (H23B 74)

National 4 – Mechanisms & Structures (H23D 74)

National 5 – Engineering Contexts & Challenges (H23A 75)

National 5 – Electronics & Control (H23B 75)

National 5 – Mechanisms & Structures (H23D 75)

02 Section 2: Comments on assessment

Twenty-four centres were selected for verification in this round. There was a decrease in the proportion of centres that were 'not accepted' at verification relative to Round 1. This improvement is to be commended.

Assessment approaches

As per Round 1, a range of approaches to assessment were adopted by centres. These involved including use of the SQA-produced Unit assessment support pack 2 (UASP2) — Unit-by-Unit approach — and UASP3 (combined approach), in addition to centres devising their own instruments of assessment.

It was generally felt that where a centre had used a UASP, the validity of the approach was not in question. However, a small number of centres had only partially used the UASP, meaning that not all Assessment Standards were

covered. Care must be taken to ensure that all Assessment Standards are covered when providing evidence for assessment.

A very small number of centres supplied evidence generated from assessments of the old Technological Studies Course. While this does not automatically invalidate the material, it should be stressed that Engineering Science is a completely new Course with a new range of assessable items. If centres do use this material, or if they devise their own material, it must be cross-referenced with the Assessment Standards in the 'Judging evidence' tables. Please note that, where a centre's evidence varies considerably from the SQA UASPs, it is advised that the prior verification service is used.

Assessment judgements

A small number of centres were found to be using earlier versions of UASPs (which have since been replaced). Please note that if centres choose to use the SQA-produced UASPs, they must ensure that they are using the most recent version, which can be found on the SQA secure site.

The reliability of assessment judgements varied from centre to centre. In some centres, there were a number of administrative errors in the paperwork. For example, in some cases the incorrect Unit code was input, and in others, the marking was inconsistent with the verifier's judgements. It is expected that, with the application of effective internal verification procedures, this will be largely addressed.

03 Section 3: General comments

A number of centres provided evidence for testing for National 5. Please note that testing AND evaluating is necessary for National 5. Evaluations should include comments for improvements, etc.

It was generally felt that a large number of centres are becoming more comfortable with the assessment requirements for the new Courses. This has to be commended and we look forward to further improvements in the future.

NQ Verification 2013–14
Key Messages Round 3

01 Section 1: Verification group information

Verification group name:	**Engineering Science**
Verification event/visiting information	**Event**
Date published:	**June 2014**

National Courses/Units verified:

National 5 Course Assignment (IACCA)

02 Section 2: Comments on assessment

Assessment approaches

All centres used the SQA-provided Course Assignments, therefore ensuring that all assessment instruments were valid.

Assessment judgements

The majority of centres verified were Accepted or Accepted*. Accepted* indicates that there are some recommended actions, but that there was overall agreement with the approach to assessment and the reliability of the assessment judgements. Additional guidance is given below on the sections of the assessment task.

Section 1

Specifications were completed particularly well across the sample; however, a number of issues were present in the systems/sub-systems diagrams. For example, a number of centres had consistent errors in presenting the diagrams in a standard format, ie incorrect system boundaries, boxes around inputs and outputs, incorrect feedback loops, lack of drivers, components in the wrong place, etc.

Section 2

It is worth noting that flowcharts may have errors in them at this point — it is early in the design process. However, they should be fixed after testing (Section 3b). Sketches for structures/mechanisms are required and these, in general, were found to be of a good standard. While it is worth remembering that we are not assessing the quality of the graphic work, it is helpful to ensure that sketches are appropriately annotated.

Section 3a

Evidence must be provided for a constructed model of the structure and/or mechanism (alternatively, evidence of a simulation would suffice).

Please note that any model must be the candidate's own work. Use of a pre-built model without evidence of simulation will mean that the candidate will be awarded zero marks.

The materials and components used for the sub-system must be stated and fully justified. A large variance was found in the samples with respect to the quality of the evidence provided for this section.

Section 3b

Evidence must be provided for a constructed microcontroller/electronic sub-system, along with attached inputs and outputs (alternatively, evidence of a simulation would suffice).

Please note that any model must be the candidate's own work. Use of a pre-built model without evidence of simulation will result in the candidate being awarded zero marks.

In addition, a correct microcontroller code (to match the flowchart from Section 2) must be included. If the code is further developed at this point to improve the system, further versions of the code must be supplied.

Although the band descriptors call for integration with the mechanical sub-system, this was not insisted on due to practical difficulties.

Examples of good practice found included the inclusion of pin-out diagrams to clearly define what input or output each pin was connected to, and the inclusion of comments within the programme code.

Section 4

Evidence for this section must include detail of the tests planned and what outcomes were expected (future tense), details of the actual test results (past tense) and details of any adjustments made as a result of the tests.

This was found to be a real challenge to a significant number of centres. It is not good enough to say that a system worked. Comments must compare each sub-system with the original specification and note any adjustments made, giving justifications for the adjustments to the system.

Section 5

Evaluations should refer to the outcomes from Section 4, comparing them with the original specification from Section 1 and suggesting possible improvements to the system.

A full record of progress should include lesson-by-lesson details of what was done, teacher assistance required and what was learned.

Please note that full descriptive responses are required to meet the level of challenge of the National 5 Course.

03 Section 3: General comments

Internal verification

It was found that some centres had robust policies in place and had evidence of following them. However, policy statements on their own, without evidence of implementation, are not enough to ensure good quality assurance practices.