Course report 2025

Higher Engineering Science

This report provides information on candidates' performance. Teachers, lecturers and assessors may find it useful when preparing candidates for future assessment. The report is intended to be constructive and informative, and to promote better understanding. You should read the report with the published assessment documents and marking instructions.

We compiled the statistics in this report before we completed the 2025 appeals process.

Grade boundary and statistical information

Statistical information: update on courses

Number of resulted entries in 2024: 1,395

Number of resulted entries in 2025: 1,399

Statistical information: performance of candidates

Distribution of course awards including minimum mark to achieve each grade

Course award	Number of candidates	Percentage	Cumulative percentage	Minimum mark required
A	367	26.2	26.2	112
B	235	16.8	43.0	96
C	258	18.4	61.5	80
D	245	17.5	79.0	64
No award	294	21.0	100%	Not applicable

We have not applied rounding to these statistics.

You can read the general commentary on grade boundaries in the appendix.

In this report:

- ‘most’ means greater than or equal to 70%
- ‘many’ means 50% to 69%
- ‘some’ means 25% to 49%
- ‘a few’ means less than 25%

You can find statistical reports on the statistics and information page of our website.

Section 1: comments on the assessment

Question paper

The question paper sampled the content as detailed in the course specification. The balance of A to C questions was appropriate and provided suitable differentiation.

Marker feedback and item analysis confirmed that all questions functioned as intended, and that every mark was accessible. This is reflected in the grade boundary decisions.

Assignment

The assignment performed as intended, with the full range of marks awarded in each task.

Markers indicated that the assignment was fair and balanced, and that it effectively sampled the engineering skills and knowledge set out in the course specification.

Candidates performed exceptionally well when demonstrating the skill of building circuits (simulating or constructing) but found the skill of evaluating the most demanding in the assignment.

Section 2: comments on candidate performance

Areas that candidates performed well in

Question paper

Question 1

Most candidates demonstrated a very good understanding of how to draw an equivalent digital logic circuit using NAND gates from an existing digital logic circuit, and how to simplify the equivalent circuit.

Question 2(a)

Most candidates correctly calculated V_{out} for the given circuit.

Question 2(c)

Most candidates correctly stated the op-amp configuration.

Question 5

Many candidates correctly calculated R and the angle.

Question 8(a)

Most candidates correctly calculated rotational speed.

Question 8(d)

Most candidates correctly calculated the energy recovered when the car's velocity changed.

Question 8(f)

Most candidates correctly calculated the value of the feedback resistor.

Question 9(a)

Many candidates correctly calculated the value of V_{ref}.

Question 9(b)(i)

Most candidates correctly calculated the value of the base current.

Question 9(b)(ii)

Most candidates correctly calculated the value of the collector current.

Question 11(a)

Many candidates correctly calculated the factor of safety.

Question 11(b)(i)

Many candidates correctly calculated the change in length in member A.

Question 11(c)

Many candidates correctly calculated the magnitude of $F_{cylinder}$.

Question 12(d)

Many candidates correctly calculated the resistance of the fixed resistor.

Assignment

Task 1(d)

Most candidates achieved full marks in this task, successfully designing and simulating an electronic circuit.

Task 1(e)

Most candidates achieved full marks in this task, successfully designing a test plan for an electronic circuit.

Task 2

Most candidates achieved full marks in this task, successfully analysing a specification and producing a control diagram.

Task 3(b)

Most candidates achieved full marks in this task, successfully stating the most appropriate material for the new monocoque and justifying their choice.

Task 5(b)

Most candidates achieved full marks in this section, successfully simulating a microcontroller system and the flowchart program integrated together.

Areas that candidates found demanding

Question paper

Question 3

Many candidates did not calculate the correct magnitude or direction of reaction B.

Question 7(a)

Many candidates did not identify the properties of material C.

Question 7(c)(i)

Many candidates did not identify the skills of a structural engineer.

Question 7(c)(ii)

Some candidates did not identify the skills of an environmental engineer.

Question 9(c)

A few candidates described what happened when V_{heat} rises from 0v to 5v.

Question 9(d)

A few candidates described an adaptation that would adjust the temperature at which the heater or fan would switch on and off.

Question 10(a)

A few candidates correctly completed a Boolean equation to describe the smoke effect being activated.

Question 11(b)(ii)

A few candidates correctly gave two reasons for the structural engineer's advice on the factor of safety.

Question 12(a)(i)

A few candidates used appropriate terminology when describing the operation of the pneumatic circuit.

Question 12(a)(ii)

A few candidates correctly explained the function of value Z.

Question 12(b)

Some candidates described an advantage of the MOSFET over a bipolar junction transistor.

Question 12(c)

Some candidates described the meaning of threshold voltage for a MOSFET.

Question 12(f)

Many candidates did not calculate the MOSFET drain-source current.

Assignment

Task 1(a)

Many candidates did not label substituted components or indicate the orientation of components. Some candidates, when constructing using physical components, did not provide clear picture evidence that enabled piping to be easily identifiable and followed.

Task 1(c)

Most candidates appeared to find this evaluation task challenging and did not refer to the performance, testing and amendments made to meet each specification point.

Task 5(a)

Many candidates appeared to find this design task demanding and did not use the least number of logic gates possible by converting to NAND equivalents.

Task 5(d)

Most candidates appeared to find this evaluation task challenging and did not justify the performance of their amended microcontroller system against the full specification.

Section 3: preparing candidates for future assessment

Question paper

Teachers and lecturers must ensure that candidates are prepared in all areas of the course specification so that they can fully respond to the question paper.

Teachers and lecturers should ensure that candidates have a clear understanding of the expected response to descriptive questions.

Teachers and lecturers should ensure that candidates are clear on how to respond to descriptive questions about pneumatic circuits. Candidates must use appropriate terminology, with a statement referring to 3/2 valves actuating, 5/2 valves changing state, and a piston instroking or outstroking as appropriate to the given scenario.

Teachers and lecturers should ensure that candidates do not round intermediate values during calculation but only apply the correct rounding to their final answer for each question, as detailed on the question paper cover page.

Assignment

Candidates may benefit from spending time developing their terminology to allow them to respond to tasks. Additionally, candidates will benefit from preparing evaluation responses, such as referring to a given specification or context and making evaluative comments.

Candidates may benefit from developing their skills in the areas of simulating/constructing and evaluating, with a particular focus on the language and detail required for a Higher-level response, to access the marks in these tasks.

Teachers and lecturers should ensure the simulation software that candidates use provides the flexibility required to match what is being asked in the task.

Teachers and lecturers should encourage candidates to read the requirements of each task carefully. While some tasks may appear similar to a previous assignment, there may be significant differences.

Teachers and lecturers should ensure that photographs or screenshots are clear and allow components to be easily identified. Any photographs or screenshots that are unclear risk the candidates missing out on marks due to text being unreadable or cut off, or components and connections not being clear.

Teachers and lecturers must strictly adhere to the instructions and assessment conditions for the assignment as outlined in the Higher Engineering Science course specification and in the assignment documentation.

More information and supporting documentation on the full course assessment is available on the Higher Engineering Science subject page. This includes the course specification, past papers (question paper and assignment), specimen assignment and question paper, and previous years' course reports. Teachers and lecturers should continue to use the published materials available on the Understanding Standards website, which contains candidate evidence from past question papers and assignments, along with supporting commentary, presentations and webinar recordings.

Appendix: general commentary on grade boundaries

Our main aim when setting grade boundaries is to be fair to candidates across all subjects and levels and to maintain comparable standards across the years, even as arrangements evolve and change.

For most National Courses, we aim to set examinations and other external assessments and create marking instructions that allow:

- a competent candidate to score a minimum of 50% of the available marks (the notional grade C boundary)
- a well-prepared, very competent candidate to score at least 70% of the available marks (the notional grade A boundary)

It is very challenging to get the standard on target every year, in every subject, at every level. Therefore, we hold a grade boundary meeting for each course to bring together all the information available (statistical and qualitative) and to make final decisions on grade boundaries based on this information. Members of our Executive Management Team normally chair these meetings.

Principal assessors utilise their subject expertise to evaluate the performance of the assessment and propose suitable grade boundaries based on the full range of evidence. We can adjust the grade boundaries as a result of the discussion at these meetings. This allows the pass rate to be unaffected in circumstances where there is evidence that the question paper or other assessment has been more, or less, difficult than usual.

- The grade boundaries can be adjusted downwards if there is evidence that the question paper or other assessment has been more difficult than usual.
- The grade boundaries can be adjusted upwards if there is evidence that the question paper or other assessment has been less difficult than usual.
- Where levels of difficulty are comparable to previous years, similar grade boundaries are maintained.

Every year, we evaluate the performance of our assessments in a fair way, while ensuring standards are maintained so that our qualifications remain credible. To do this, we measure evidence of candidates' knowledge and skills against the national standard.

For full details of the approach, please refer to the Awarding and Grading for National Courses Policy.