Higher National Unit specification: general information

This Graded Unit has been validated as part of the HND Computer Science. Centres are required to develop the assessment instrument in accordance with this validated specification. Centres wishing to use another type of Graded Unit or assessment instrument are required to submit proposals detailing the justification for change for validation.

Graded Unit title: Computer Science: Graded Unit 2

Graded Unit code: H48Y 35

Type of Graded Unit: Project

Assessment Instrument: Practical Assignment

Publication date: July 2017

Source: Scottish Qualifications Authority

Version: 02

Unit purpose

This Graded Unit is designed to provide evidence that the candidate has achieved the following principal aims of the HND Computer Science:

1 To develop an awareness of current professional practices and technologies within the domain of computer science.
2 To develop a range of specialist knowledge and skills that reflects recent, in-demand developments in applications developments, web and mobile programming and database developments.
3 Where applicable, to provide learners with a range of underpinning knowledge that is supported by a wide range of vendors.
4 To offer articulation routes to a range of university degree programmes by developing scholarly activities and an independent learning environment.
5 To offer flexibility with the themes of Units across a range of computer science related areas

Recommended prior knowledge and skills

It is recommended that the candidate should have completed or be in the process of completing the following Units relating to the above specific aims prior to undertaking this Graded Unit:

H173 34 *Developing Software: Introduction*
H1F7 34 *Professionalism and Ethics in Computing*
H175 34 *Computer Systems Fundamentals*
H177 34 *Troubleshooting Computer Problems*
H178 34 *Team Working in Computing*
H16W 35 *Relational Database Management Systems*
H1J9 35 *Software Development: Developing Websites for Multiplatform Use*
H16S 35 *Managing a Web Server*

Credit points and level

2 Higher National Unit credits at SCQF level 8: (16 SCQF credit points at SCQF level 8*)

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

Core Skills

Achievement of this Unit gives automatic certification of the following:

Complete Core Skill *Problem Solving* at SCQF level 6

Assessment

This Graded Unit will be assessed by the use of a practical assignment. The developed practical assignment should provide the candidate with the opportunity to produce evidence that demonstrates she/he has met the aims of the Graded Unit that it covers.

The assessment exemplar for this Unit provides assessment and marking guidelines that exemplify the national standard for achievement. It is a valid, reliable and practicable instrument of assessment. Centres wishing to develop their own assessments should refer to the assessment exemplar to ensure a comparable standard. Assessment exemplars are available on SQA's secure website.

This Graded Unit is designed to evidence candidate's ability to plan, develop, implement and evaluate technical skills gained throughout their course. It does not ask the candidates to prove new skills.

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates

Graded Unit title: Computer Science: Graded Unit 2

Conditions of assessment

The candidate should be given a date for completion of the practical assignment. However, the instructions for the assessment task should be distributed to allow the candidate sufficient time to assimilate the details and carry out the assessment task. During the time between the distribution of the assessment task instructions and the completion date, assessors may answer questions, provide clarification, guidance and reasonable assistance.

The assessment task(s) should be marked as soon as possible after the completion date for each stage. The final grading given should reflect the quality of the candidate's evidence at the time of the completion date.

The evidence for the project is generated over time and involves three distinct stages, where each stage has to be achieved before the next is undertaken. Thus any re-assessment of stages must be undertaken before proceeding to the next stage.

If a candidate fails the project overall or wishes to upgrade, then this must be done using a *substantially different* project, ie all stages are undertaken using a new significantly different project assessment task, assignment, case study, etc. In this case, a candidate's grade will be based on the achievement in the re-assessment, if this results in a higher grade.

The practical assignment will be based on the development of a solution for a real client or on a scenario supplied by the centre. If the method selected by a centre is a scenario given to a number of candidates, then the centre must ensure the originality and uniqueness of each candidate submission, through a formal authentication procedure.

If a candidate is found to have plagiarised or to have gained an unfair advantage by other means, the centre should have in place procedures for dealing with this, including the authority to deem that the candidate has failed the assessment. Candidates should provide references in the form of footnotes and/or bibliography for any materials used and/or accessed which is not their own.

Each centre must ensure that the project is the authenticated work of the individual candidate. For example, centres may wish to informally question candidates at various stages on their knowledge and understanding of the project on which they have embarked. Centres should ensure that where research, etc, is carried out in other establishments or under the supervision of others, that the candidate does not receive unreasonable assistance.

Remediation, re-assessment, reasonable assistance and other Project based Graded Unit processes are detailed in the SQA publication *Guidance for the Implementation of Graded Units in Higher National Certificates and Diplomas,* to which reference should be made.

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Instructions for designing the assessment task

The assessment task is a project. The project undertaken by the candidate must be a complex task which involves:

- variables which are complex or unfamiliar
- relationships which need to be clarified
- a context which may be familiar or unfamiliar to the candidate

The assessment task must require the candidate to:

- analyse the task and decide on a course of action for undertaking the project
- identify the requirements for the project
- plan the solution for the project assignment
- organise work through to project completion
- develop the product to meet the solution
- track and document work undertaken through to project completion
- reflect on what has been done and draw conclusions for the future
- produce an evaluation with critical analysis to cover the product that has been produced and an individual reflective analysis of their activities.
- produce evidence of meeting the aims which this Group Award Graded Unit has been designed to cover

Instructions for writing the Project Brief (assignment task)

'Fleshed-out' project briefs (eg case studies) should be provided to the candidate. It is recommended that, where possible, candidates should be encouraged to find external clients.

Each candidate should undertake an individual project and it is envisaged that the candidate will carry out a project which encompasses all of the knowledge and skills required to complete a small scale project for an external client (such as the development of a commercially viable website or the development of a PC based management system). The assessment should be based on the product, its evaluation and the process. A candidate must:

1 Interpret the needs of the brief.
2 Gather information to clarify the brief.
3 Decide upon and develop a design approach.
4 Carry out development.
5 Evaluate the product and their performance.

The Unit will be project based and allow the candidate the flexibility to select from a variety of different projects, eg the practical implementation of a software development project (mobile app/web site/game/stand-alone application), designing a network topology for a small to medium sized company, producing a report/feasibility study on the implementation of IT systems for an organisation or setting up a Service Desk.

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Graded Unit title: Computer Science: Graded Unit 2

Guidance on grading candidates

Candidates who meet the minimum Evidence Requirements will have their achievement graded as C — competent, or A — highly competent or B somewhere between A and C. The grade related criteria to be used to judge candidate performance for this Graded Unit is specified in the following table.

Grade A	Grade C
Is a seamless, coherent piece of work which:	Is a co-ordinated piece of work which:
♦ has sufficient evidence for all three stages of the project produced to a high standard, and is quite clearly inter-related.	♦ has sufficient evidence for all three stages of the project and is produced overall to an adequate standard.
♦ demonstrates an accurate and insightful interpretation of the project brief.	♦ demonstrates an acceptable interpretation of the project brief.
♦ is highly focused and relevant to the tasks associated with the project brief.	♦ is focused and relevant to the tasks associated with the project brief.
♦ is clear and well structured throughout and the language used is of a uniformly high standard in terms of level, accuracy and technical content.	♦ is satisfactorily structured and the language used is adequate in terms of level, accuracy and technical content.
♦ effectively consolidates and integrates the required knowledge and skills.	♦ consolidates and integrates knowledge and skills but this may lack some continuity and consistency
♦ demonstrates the candidate's ability to work autonomously with minimum support or revision.	♦ demonstrates the candidates' ability to work with limited support and occasional revision

The project will be marked out of 100. Assessors will mark each stage of the project taking into account the criteria outlined in the table above. Candidates can only progress to the next stage if they have met the minimum Evidence Requirements of the previous stage. At the end of each stage, there should be opportunities for remediation/re-assessment on that particular stage.

Remediation/re-assessment would take place where either the quality of work submitted for that stage does not meet the minimum standard required and/or there are missing Minimum Evidence Requirements.

Remediation processes and what is considered Reasonable Assistance are detailed in the SQA publication *Guidance for the Implementation of Graded Units in Higher National Certificates and Diplomas*.

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Graded Unit title: Computer Science: Graded Unit 2

All allocated marks will be aggregated to arrive at an overall mark for the project. The **final** grading given should reflect the quality of the candidate's evidence at the time of the **Unit** completion date and must take into account the grade levels indicated in each of the three stages by reference to the table above.

Assessors will assign an overall grade to the candidate for this Graded Unit based on the following grade boundaries.

A = 70%–100%
B = 60%–69%
C = 50%–59%

The candidate must achieve a minimum of:

- 50% of total marks for the Planning stage
- 50% of total marks for the Developing stage
- 50% of total marks for the Evaluating stage

NOTE: The candidate must achieve **all of the minimum evidence** specified below for each stage of the project in order to pass the Graded Unit.

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Graded Unit title: Computer Science: Graded Unit 2

Evidence Requirements

The project consists of three stages: planning; developing; and evaluating. The following table specifies the minimum evidence required to pass each stage.

NOTE: The candidate must achieve **all of the minimum evidence** specified below for each stage of the project in order to pass the Graded Unit.

Project stage	Minimum Evidence Requirements
Stage 1 — Planning 40% Maximum	The assessor's role is as a facilitator and so to gain high marks the candidate must demonstrate a high degree of autonomy in the planning activities. Evidence, in the form of an **Action Plan** report containing the following: ♦ **An analysis of the project assignment brief -— up to 30 marks** Which should include but not be restricted to the following: — interpretation of the project assignment brief including any information gathered to clarify the brief — aims of the project assignment — requirements: eg functional/non-functional/constraints — identification of the key factors influencing the project — identification of resources, and materials required and how they will be accessed/obtained — identification of information sources to be used — undertaking the analysis using appropriate techniques ♦ **Project plan — up to 10 marks** Production of a detailed formal plan to undertake the project: with realistic timescales and identifying: — timescales/schedules for each stage and overall completion — milestones and deliverables — main tasks — resources
	The candidate must all of the minimum evidence specified above in order to pass the Planning stage.

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Graded Unit title: Computer Science: Graded Unit 2

Project stage	Minimum Evidence Requirements
Stage 2 — Developing 40% Maximum	The assessor's role is as a facilitator and so to gain high marks the candidate must demonstrate a high degree of autonomy in the developing activities. Evidence of the candidate: ♦ Implementing the planned solution to the task and tracking the implementation — up to **30 marks** ♦ Testing the implemented solution tracking any changes and making amendments where required — up to **8 marks** ♦ Managing the project — up to **2 marks**. **The evidence may be recorded using appropriate techniques such as software, logbooks (electronic, manual or both), work diaries, reports, etc.**
	The candidate must all of the minimum evidence specified above in order to pass the Developing stage.

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Graded Unit title: Computer Science: Graded Unit 2

Project stage	Minimum Evidence Requirements
Stage 3 — Evaluating 20% Maximum	The assessor's role is as a facilitator and so to gain high marks the candidate must demonstrate a high degree of autonomy in the evaluating activities. Evidence should be in the form of a **report** showing the evaluation of the effectiveness of the approach/strategy taken, which includes all stages of the activity **up to 20 marks.** The **evaluation report** should include all of the following: ♦ an outline of the assignment and to what extent the solution met the original requirements of the assignment brief ♦ an assessment of the strengths and weaknesses of the outputs of the practical assignment ♦ recommendations for any future development of the solution and reasons for these recommendations ♦ a summary of any modifications to the project plan, solution design and/or implementation, that were made during the project. Including reference to any unforeseen events and how they were handled. ♦ Identification of any knowledge and skills which have been gained or developed while carrying out the project assignment and how the actions/process of carrying out the project could have been improved
	The candidate must all of the minimum evidence specified above in order to pass the Evaluating stage.

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Graded Unit title: Computer Science: Graded Unit 2

Support notes

Guidance on grading and marks allocation to assessors and use of marking schemes will be given in the supporting Exemplar/Assessment Support Pack for this Unit.

Always refer to the latest version of the SQA publication *Guidance for the Implementation of Graded Units in Higher National Certificates and Diplomas* prior to start of delivery of this Graded Unit.

For project-based Graded Units, it is a requirement that candidates must pass the Planning stage before progressing to the Developing stage, and must pass the Developing stage before progressing to the Evaluating stage. This means that assessors must be satisfied that candidates have met the minimum Evidence Requirements for each stage before progressing to the next. However, it is important that assessors manage candidate expectations and do not make irrevocable decisions on grading until the final stage is complete and assessors have had an opportunity to view the work as a whole. There will be an indication at each stage of how well a candidate is performing. However, a candidate may do a wonderful job of the Planning stage but produce a basic competent practical assignment, or a candidate might produce a basic plan for the production of an item but go on to produce an innovative and complex product at the Developing stage. The weighting for each stage also has to be taken into account. For example, if Planning is 30%, Developing 30% and Evaluating 40% and a candidate provides just the minimum Evidence Requirements for Planning and Evaluating but does a fantastic job on Developing, the assessor must judge where the balance of grading should lie — clearly doing just one thing really well would not be sufficient to gain an overall high grade.

The final grading given should reflect the quality of the candidate's evidence at the time of the Unit completion date and must take into account the grade levels indicated in each of the three stages by reference to the Grade Related Criteria table above. For example where a candidate has been allowed revision/remediation, then this would indicate a grade 'C' for that stage, so overall a final grade 'A' would not be awarded. (Refer to grade 'A' criteria 2 above — no high level of performance demonstrated in each stage.) However if some re-assessment opportunities were provided only for one stage, this would not necessarily preclude a grade 'B'.

When allocating the final grade on completion, a levelling process should be adopted taking the Grade Related Criteria and overall marks into account, eg A candidate may achieve 20/40 for Planning *following remediation*, 35/40 for Developing, 17/20 for Evaluation — this would indicate an A grade (72 out of 100) but due to inadequate planning performance would not meet the A grade criteria and therefore may be levelled at a B grade.

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Graded Unit title: Computer Science: Graded Unit 2

The project should be designed to meet the expectations of the aims and objectives of the HND Computer Science award, which are as follows:

The general aims of this award are to:

- develop candidates' knowledge and skills in planning, developing and evaluating
- develop employment skills, particularly relating to the IT industry
- enable progression to further studies within the Scottish Credit and Qualifications Framework
- develop and support study and research skills
- develop strategies for learning and encourage transferable skills
- provide academic stimulus
- support learners' continuing professional development.

The specific aims of this award are:

- to develop an awareness of current professional practices and technologies within the domain of computer science.
- to develop a range of specialist knowledge and skills that reflects recent, in-demand developments in applications developments, web and mobile programming and database developments.
- where applicable, to provide learners with a range of underpinning knowledge that is supported by a wide range of vendors.
- to offer articulation routes to a range of university degree programmes by developing scholarly activities and an independent learning environment.
- to offer flexibility with the themes of Units across a range of computer science related areas

The assessor should meet the candidate regularly to discuss their progress through the stages. These meetings should be treated by the assessor as a management review of the candidate's activities keeping track of the progress of the project comparing the actual with the planned progress. This will allow the assessor to modify deliverable dates (in agreement with the candidate) so that the candidate manages to complete the work in the required time. An assessor should take a 'project' approach to this Graded Unit with a candidate delivering a coherent piece of work. The project undertaken should provide the candidate with the opportunity to develop knowledge and skills gained in the other Units of study.

An assessor should ensure that the project allows a candidate to produce the required evidence at SCQF level 8.

Plagiarism is a major issue for assessors in education and the assessor must ensure the authenticity of the candidate evidence. A candidate should be formally issued with the statement, which follows:

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Graded Unit title: Computer Science: Graded Unit 2

Plagiarism

Assessors are required to ensure the authenticity of the candidate's work. Regular progress meetings are one way of ensuring that the candidate's work is their own. The opportunity should be taken at these meetings to use probing questions to authenticate the assessment material. Plagiarism is a potential issue with written work. Assessors must ensure that the candidate is aware of their centre's plagiarism policy and ensure that submitted material is consistent with that policy. Further advice about plagiarism is available from SQA.

Guidance on the content and context for this Unit

It is recommended that the candidate should have completed or be in the process of completing the following Units related to the specific aims of the award prior to undertaking this Group Award Graded Unit.

H16W 35 *Relational Database Management Systems*
H1J9 35 *Software Development: Developing Websites for Multiplatform Use*
H16S 35 *Managing a Web Server*

The project brief should include a sample of topics and issues selected from the following list of Outcomes from mandatory Units. The assessor may want to consider some suggestions in the table below.

Unit code	Unit title	Topics/Issues
H173 34	Developing Software: Introduction	Any
H1F7 34	Professionalism and Ethics in Computing	Any
H175 34	Computer Systems Fundamentals	Any
H177 34	Troubleshooting Computer Problems	Any
H178 34	Team Working in Computing	Any
H16W 35	Relational Database Management Systems	Any
H1J9 35	Software Development: Developing Websites for Multiplatform Use	Any
H16S 35	Managing a Web Server	Any

NOTE: The list of Topics/Issues in the above table is not exhaustive. Depending on the characteristics of the project brief, the assessor may draw Outcomes from other Units in the HN framework provided such Units were undertaken by the candidate.

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Graded Unit title: Computer Science: Graded Unit 2

Using ICT to Support Assessment

There is opportunity for peer evaluation of product design and implementation. The candidates may be inclined to do this anyway but would benefit from a more formalised approach. The assessor must re-iterate to the candidates that direct copying of work is not allowed, but in industry it would be normal practice to confer with colleagues and stimulate discussion, which may assist with problem solving.

Candidates should be encouraged to produce an e-portfolio of all work, or a digitised log-book. This may lift barriers for distance learning students. If e-portfolios and or log-books are used the assessor should consult the publications available from the e-assessment section of the SQA website, including the following:

SQA Guidelines on Online Assessment for Further Education (March 2003)

Assessment and Quality Assurance in Open & Distance Learning (February 2001)

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**

History of changes to Unit

Version	Description of change	Date
02	Grade C criteria – refined to wording to level of support	July 2017

General information for candidates

Graded Unit title: Computer Science: Graded Unit 2

This Graded Unit is designed to provide evidence that you have achieved the following principal aims of the HND Computer Science:

1 To develop an awareness of current professional practices and technologies within the domain of computer science.
2 To develop a range of specialist knowledge and skills that reflects recent, in-demand developments in applications developments, web and mobile programming and database developments.
3 Where applicable, to provide learners with a range of underpinning knowledge that is supported by a wide range of vendors.
4 To offer articulation routes to a range of university degree programmes by developing scholarly activities and an independent learning environment.
5 To offer flexibility with the themes of Units across a range of computer science related areas.

It is recommended that you should have completed or be in the process of completing the following mandatory Units relating to the above specific aims prior to undertaking this Graded Unit:

H16W 35 *Relational Database Management Systems*
H1J9 35 *Software Development: Developing Websites for Multiplatform Use*
H16S 35 *Managing a Web Server*

This Graded Unit is designed to provide evidence of your ability to plan, develop, implement and evaluate technical skills gained throughout your course. It does not ask you to prove new skills. During the Unit you will be expected to:

1 Interpret the needs of the project from the brief.
2 Gather information to plan and develop the project.
3 Decide upon and develop a design approach.
4 Carry out the development.
5 Evaluate the product and process.
6 Evaluate their own performance.

The assessment task is a project. The project will be a complex task which involves:

1 Variables which are complex or unfamiliar.
2 Relationships which need to be clarified.
3 A context which may be familiar or unfamiliar to you.

General information for candidates (cont)

Graded Unit title: Computer Science: Graded Unit 2

The project will be marked out of 100. Your will mark each stage of the project taking into account the criteria outlined. You can only progress to the next stage if they have met the minimum Evidence Requirements of the previous stage. At the end of each stage, there will be opportunities for remediation/re-assessment on that particular stage. All allocated marks will be aggregated to arrive at an overall mark for the project. Assessors will assign an overall grade to the candidate for this Graded Unit based on the following grade boundaries.

A = 70%–100%
B = 60%–69%
C = 50%–59%

The candidate must achieve a minimum of:

- 50% of total marks for the Planning stage
- 50% of total marks for the Developing stage
- 50% of total marks for the Evaluating stage