



## Higher National Unit specification: general information

This Graded Unit has been validated as part of the HND Computing: Networking. 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:** Computing: Networking: Graded Unit 2

**Graded Unit code:** H40G 35

**Type of Graded Unit:** Project

**Assessment Instrument:** Practical Assignment

**Publication date:** July 2018

**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 HND Computing Networking.

- 1 To develop a range of specialist knowledge and skills in networking technologies.
- 2 Where applicable, to provide learners with the underpinning knowledge and skills that may allow them to sit vendor certification examinations.
- 3 To prepare candidates for progression to further studies in a related discipline at SCQF level 9.
- 4 To prepare candidates for employment in the general category of IT&T engineer/IT&T technician.

## 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:

FR22 35     *Networking Technology*  
FR22 35     *Routing Technology*  
H16X 35     *Server Administration*

## Higher National Unit specification: general information (cont)

### 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 National 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 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:** Computing: Networking: 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.

Reasonable assistance is the term used by SQA to describe the difference between providing candidates with some direction to generate the required evidence for assessment and providing too much support, which would compromise the integrity of the assessment. Reasonable assistance is part of all learning and teaching processes. In relation to the assessment of Higher National Project-based Graded Units, assessors may provide advice, clarification, and guidance during the time between the distribution of the project instructions and the completion date, ie at each stage of the project.

Remediation allows an assessor to clarify candidate responses, either by requiring a written amendment or by oral questioning, where there is a minor shortfall or omission in evidence requirements. In either case, such instances must be formally noted by the assessor, either in writing or recording, and be made available to the internal and external verifier. In relation to Higher National Project-based Graded Units, candidates must be given the opportunity for remediation at each stage of the project.

The evidence for a Higher National Project-based Graded Unit is generated over time and involves three distinct stages, each of which has to be achieved before the next is undertaken. This means that any re-assessment of stages must be undertaken before proceeding to the next stage. The overall grade is derived from the total number of marks across *all* sections, and should reflect the ability of the candidate to work autonomously and the amount of support required. In relation to Higher National Project-based Graded Units, candidates who have failed any stage of the project and have been unable to provide the necessary evidence through remediation must be given the opportunity for re-assessment of that stage.

The assessment task 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 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.

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

### **Graded Unit title:** Computing: Networking: Graded Unit 2

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.

### **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)**

Each candidate should undertake an individual project and the context envisaged is that the candidate will carry out a project which encompasses all of the knowledge and skills which would be required to complete a small scale project for an external client. 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 which are representative of the Network Technician role, eg designing a client/server network topology for a small to medium sized company, designing server provision for an organisation or designing the security requirements for a small to medium sized company.

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

**Graded Unit title:** Computing: Networking: 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
<p>Is a seamless, coherent piece of work which:</p> <ul style="list-style-type: none"> <li>◆ has sufficient evidence for all three stages of the project produced to a high standard, and is quite clearly inter-related.</li> <li>◆ demonstrates an accurate and insightful interpretation of the project brief.</li> <li>◆ is highly focused and relevant to the tasks associated with the project brief.</li> <li>◆ is clear and well-structured throughout and the language used is of a uniformly high standard in terms of level, accuracy and technical content.</li> <li>◆ effectively consolidates and integrates the required knowledge and skills.</li> <li>◆ demonstrates the candidate's ability to work autonomously with minimum support or revision.</li> </ul>	<p>Is a co-ordinated piece of work which:</p> <ul style="list-style-type: none"> <li>◆ has sufficient evidence for all three stages of the project and is produced overall to an adequate standard.</li> <li>◆ demonstrates an acceptable interpretation of the project brief.</li> <li>◆ is focused and relevant to the tasks associated with the project brief.</li> <li>◆ is satisfactorily structured and the language used is adequate in terms of level, accuracy and technical content.</li> <li>◆ consolidates and integrates knowledge and skills but this may lack some continuity and consistency.</li> <li>◆ demonstrates independent learning with minimum support and revision during project.</li> </ul>

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 and re-assessment on that particular stage.

Remediation and 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.

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

### Graded Unit title: Computing: Networking: 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%

Any candidate who has failed their graded unit or wishes to upgrade their award must be given a re-assessment opportunity, or in exceptional circumstances, two re-assessment opportunities. In the case of project-based graded units, this must be done using a substantially different project.

The final grading given must reflect the quality of the candidate's evidence at the time of the completion of the graded unit. Candidates must be awarded the highest grade achieved — whether through first submission or through any re-assessment, remediation, and/or reasonable assistance provided.

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:** Computing: Networking: 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	<p>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.</p> <p>Evidence, in the form of an <b>Action Plan</b> report containing the following:</p> <ul style="list-style-type: none"> <li>◆ <b>An analysis of the project assignment brief — up to 30 marks</b></li> </ul> <p>Which should include but not be restricted to the following:</p> <ul style="list-style-type: none"> <li>— interpretation of the project assignment brief including any information gathered to clarify the brief</li> <li>— aims of the project assignment</li> <li>— requirements: functional/non-functional/constraints</li> <li>— identification of the key factors influencing the project</li> <li>— identification of resources, and materials required and how they will be accessed/obtained</li> <li>— identification of information sources to be used</li> <li>— undertaking the analysis using appropriate techniques</li> </ul> <ul style="list-style-type: none"> <li>◆ <b>Project plan — up to 10 marks</b></li> </ul> <p>Production of a detailed formal plan to undertake the project: with realistic timescales and identifying:</p> <ul style="list-style-type: none"> <li>— timescales/schedules for each stage and overall completion</li> <li>— milestones and deliverables</li> <li>— main tasks</li> <li>— resources</li> </ul> <p><i>The candidate must all of the minimum evidence specified above in order to pass the Planning stage.</i></p>

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

**Graded Unit title:** Computing: Networking: Graded Unit 2

Project stage	Minimum Evidence Requirements
Stage 2 — Developing 40% Maximum	<p>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.</p> <p>Evidence of the candidate:</p> <ul style="list-style-type: none"> <li>◆ Implementing the planned solution to the task and tracking the implementation — up to <b>30 marks</b></li> <li>◆ Testing the implemented solution tracking any changes and making amendments where required — up to <b>8 marks</b></li> <li>◆ Managing the project — up to <b>2 marks</b></li> </ul> <p><b>The evidence may be recorded using appropriate techniques such as software, logbooks (electronic, manual or both), work diaries, reports, etc.</b></p>
	<p><i>The candidate must all of the minimum evidence specified above in order to pass the Developing stage.</i></p>



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

**Graded Unit title:** Computing: Networking: Graded Unit 2

Project stage	Minimum Evidence Requirements
Stage 3 — Evaluating 20% Maximum	<p>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.</p> <p>Evidence should be in the form of a <b>report</b> showing the evaluation of the effectiveness of the approach/strategy taken, which includes all stages of the activity <b>up to 20 marks</b>.</p> <p>The <b>evaluation report</b> should include all of the following:</p> <ul style="list-style-type: none"> <li>◆ an outline of the assignment and to what extent the solution met the original requirements of the assignment brief</li> <li>◆ an assessment of the strengths and weaknesses of the outputs of the practical assignment</li> <li>◆ recommendations for any future development of the solution and reasons for these recommendations</li> <li>◆ 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</li> <li>◆ 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</li> </ul> <p><i>The candidate must all of the minimum evidence specified above in order to pass the Evaluating stage.</i></p>

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

**Graded Unit title:** Computing: Networking: 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.

Examples of criteria which would indicate a grade 'A' in Computer Networking and for a grade 'C':

Grade A	Grade C
<ul style="list-style-type: none"><li>◆ Includes efficient and effective address allocation</li><li>◆ Includes clear and detailed logical diagrams detailing Internetworking devices and connections between such devices</li><li>◆ A thorough and insightful justification of configurations selected</li></ul>	<ul style="list-style-type: none"><li>◆ Includes workable address allocation.</li><li>◆ Includes readable logical diagrams detailing Internetworking devices and connections between such devices</li><li>◆ Justifies configurations</li></ul>

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

General aims of this award are to:

- ◆ develop the candidate's knowledge and skills such as planning, analysing and evaluating
- ◆ develop employment skills and enhance candidates' employment prospects
- ◆ enable progression within the SCQF
- ◆ develop study and research skills
- ◆ develop transferable skills including Core Skills
- ◆ provide academic stimulus and challenge, and foster an enjoyment of the subject
- ◆ support learners' continuing professional development

The specific aims of this award are:

- ◆ to develop a range of specialist knowledge and skills in networking technologies
- ◆ where applicable, to provide learners with the underpinning knowledge and skills that may allow them to sit vendor certification examinations
- ◆ to prepare candidates for progression to further studies in a related discipline at SCQF level 9
- ◆ to prepare candidates for employment in the general category of IT&T engineer/IT&T technician

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

### Graded Unit title: Computing: Networking: Graded Unit 2

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:

#### 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.

FR22 35	<i>Routing Technology</i>
FR34 35	<i>Networking Technology</i>
H16X 35	<i>Server Administration</i>

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.

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

**Graded Unit title:** Computing: Networking: Graded Unit 2

Unit code	Unit title	Topics/Issues
FR22 35	Routing Technology	Interior gateway routing protocols. Implement a routed network topology.
FR34 35	Networking Technology	Contemporary IP addressing schemes
H16X 35	Server Administration	Monitor and maintain servers. Application and data provisioning. Business continuity and high availability Virtualisation

**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.

### 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 following SQA Publications:

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

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

### Equality and inclusion

This graded unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website [www.sqa.org.uk/assessmentarrangements](http://www.sqa.org.uk/assessmentarrangements)

## History of changes to Unit

Version	Description of change	Date
02	Update of Conditions of Assessment	24/07/18

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**FURTHER INFORMATION:** Call SQA's Customer Contact Centre on 44 (0) 141 500 5030 or 0345 279 1000.

## General information for candidates

### Graded Unit title: Computing: Networking: Graded Unit 2

This Graded Unit is designed to provide evidence that you have achieved the principal aims of the HND Computing: Networking.

- ◆ To develop a range of specialist knowledge and skills in networking technologies
- ◆ Where applicable, to provide learners with the underpinning knowledge and skills that may allow them to sit vendor certification examinations
- ◆ To prepare candidates for progression to further studies in a related discipline at SCQF level 9
- ◆ To prepare candidates for employment in the general category of IT&T engineer/IT&T technician

It is recommended that you 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:

FR22 35	<i>Routing Technology</i>
FR34 35	<i>Networking Technology</i>
H16X 35	<i>Server Administration</i>

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.

The project will be marked out of 100. Your assessor will mark each stage of the project taking into account the criteria outlined. You can only progress to the next stage if you have met the minimum Evidence Requirements of the previous stage. At the end of each stage, there will be opportunities for remediation and 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%

You 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