Arrangements for:

HNC Computing

Group Award Code: GF3E 15

Validation date: (March 2012)

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Acknowledgement

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of Higher National qualifications.

History of changes

It is anticipated that changes will take place during the life of the qualification and this section will record these changes. This document is the latest version and incorporates the changes summarised below. Centres are advised to check SQA's APS Navigator to confirm they are using the up to date qualification structure.

NOTE: Where a Unit is revised by another Unit:

- No new centres may be approved to offer the Unit which has been revised.
- Centres should only enter candidates for the Unit which has been revised where they are expected to complete the Unit before its finish date.

Version number	Description	Date
21	**Additional Unit:** J4BF 34 Cryptography: Practical Applications, J4BG 34 Application Security and J4BH 34 Software Security, J4Y5 34 Communicating with Data and J4Y4 34 Working with Data has been added to the optional section	10/12/20
20	**Addition of Optional Units**: Emerging Technologies and Experiences (HF85 34), Artificial Intelligence (HT9T 34), Computer Programming (J0HA 34), and Cyber Resilience (HT9V 34) added as Optional Units.	13/05/20
19	**Addition of Optional Unit:** FR23 35 Switching Technology in Group 4 Local Options	21/04/20
18	**Addition of Optional Unit:** J27L 34 Data Flow added to Group 1 as an optional unit.	24/03/20
17	**Addition of Optional Unit:** J0H9 34 Data Security added as an Optional unit.	17/12/19
16	**Revision of Units:** H17V 34 Security Concepts (finish date 31/07/2020) has been replaced by HT9G 34 Network Security Concepts.	24/09/19
15	**Addition of Optional Unit:** H171 35 Software Development: Object Oriented Programming added as Local Optional unit	16/10/18
14	**Addition of Optional Unit:** HF3K 34 Web Technologies 1: HTML and CSS added as Local Optional unit.	11/09/18
13	**Revision of Units:** H1EP 34 Ethical Hacking: Fundamentals (finish date 31/07/2021) has been replaced by J0HK 34 Ethical Hacking (start date 01/08/2018). H1EN 34 Computer Forensics: Fundamentals (finish date 31/07/2021) has been replaced by J0HL 34 Digital Forensics (start date 01/08/2018)	21/06/18
12	**Additional of Optional Units**: FW5C 34 Website Design, FW5D: Website Design, Multimedia Content Creation, FW5E 34: Website Design, Development Technologies into option group 1	12/07/17
11	HH7W 34 Machines, Languages and Computation and HH7V 35 Computer Systems and Organisation have been added into GF3E 15 HNC Computing as optional units.	30/01/17
10	**Additional of Optional Units:** H7K3 35 Engineering Mathematics 4 and H8XT Statistics for Science added to Optional Group 2. DH34 35 Software Development: Event Driven Programming to Optional Group 1	21/12/16
09	**Additional Of Optional Unit:** HG1K 34 Professional Development in the IT Industry into Option group 1	31/08/16

08	**Revision of Units:** H17J 34 Developing Mobile Web Based Applications: An Introduction has been replaced by HF4Y 34. F1VV 34 User Interface Design has been replaced by HF55 34. F1YY 34 Web Development: Essential Content has been replaced by HF58 34.	12/07/16
07	**Addition of Option Unit:** H9DE 34 Digital Skills	13/08/15
06	**Revision of Unit:** DE1K 33 Workplace Communication in English has been revised by H8T2 33 and finishes on 31/07/2016.	19/05/15
05	**Addition of Optional Units:** D85F 34 Using Software Applications Packages (Group 1), D75X 34 Information Technology: Applications Software 1 (Group 1), DH35 34 Computing: Planning (Group 1), H8W8 34 Big Data (Group 1), H8W9 35 Data Science (Group 1), H8N5 35 Private Cloud Virtualisation (Group 1)	10/04/15
04	**Revision of Unit**: DK2K 34 Getting Started in Business *has been revised by* H7V4 34 Preparing to Start a Business *and will finish on* 31/07/2016.	19/01/15
03	Appendix 5 replaced. *Routing Technology* (FR22 35), *Networking Technology* (FR24 35) and *Bring Your Own Devices (BYOD): Introduction* (H6D0 34) added as optional Units to framework (Group 1).	05/06/14
02	**Addition of optional Units:** *Relational Database Management Systems* (H16W 35). **Group 3:** *Database Design and Programming in SQL* and *Database Programming with PL/SQL*.	22/10/13

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1 Introduction

This is the Arrangements Document for the revised Group Award in HNC Computing, which was validated in March 2012. This document includes: background information on the development of the Group Award, its aims, guidance on access, details of the Group Award structure, and guidance on delivery.

The HNC Computing award was last validated in 2004. The review of the award commenced in June 2010, as part of SQA's on-going review of all national qualifications.

The original intention was to review the HNC award in conjunction with the associated HND awards (HND Computing: Technical Support and HND Computing: Software Development). However, the sector indicated at an early stage in the development that it wished to widen the review to include HNC Computer Networking and HND Computer Networking and Internet Technology, since these are closely linked to the Computing awards.

As a result, the review encompassed **five** existing HN awards:

1 HNC Computing
2 HND Computing: Technical Support
3 HND Computing: Software Development
4 HNC Computer Networking
5 HND Computer Networking and Internet Technology

The Qualification Development Team (QDT), in consultation with the sector, decided to create the following new or revised awards based on these existing qualifications:

1 HNC Computing (based on HNC Computing and HNC Computer Networking).
2 HND Computer Science (new award).
3 HND Computing: Technical Support (based on existing award of the same title).
4 HND Computing: Software Development (based on existing award of the same title).
5 HND Computing: Networking (based on HND Computer Networking & Internetworking).

Although this document relates [only] to the HNC Computing award, reference will be made to the other awards when relevant. Please note that the revised HNC Computing award (GF3E 15) replaces two pre-existing HNC Computing awards (G7GL 15 HNC Computing and G7DX 15 HNC Computer Networking). The rationale for this is presented later in this document. The proposed HNDs will be presented at a future validation event.

1.1 Qualification Design Team

The first meeting of the Qualification Design Team (QDT) was held in the SQA offices in Glasgow on 30 August, 2010. In September 2010, a lead developer (LD) was nominated by the QDT. Gerry Mackie, of Dundee College, agreed to lead this development.

Due to the level of interest in this award, it was decided to create two types of member of the QDT: a *core team* member and an *extended team* member. Twelve colleges were represented in the core team, and 23 colleges were represented in the extended team. The core team served as a traditional QDT; the extended team was used for consultation purposes. A full list of core and extended members is provided in Appendix 1.[1]

The unusually large size (and representation) of the QDT reflects the national interest in this development. It also provided a large, representative group to use for consultation and decision making.

The QDT met regularly throughout the development process. There were seven face-to-face meetings of the core members between August 2010 and October 2011. Between meetings, members were able to continue conversations using an online group, which included core and extended members.

A public web log (http://hnreview.blogspot.com/) was maintained throughout the development to keep stakeholders fully informed about progress and to get feedback on the QDT decisions. At the time of writing, there have been more than 6,000 hits on the website.

This document represents the views of the entire QDT. Discussions between members of the QDT were constructive throughout the development, and the current proposals represent the consensual views of the entire (core and extended) group.

1.2 Evolution of HNC Computing

HNC Computing is one of SQA's longest established Higher National awards, having been first introduced in 1978. It has been offered in a unitised format since 1989. The most recent revisions were 1995, 2001 and 2004, following a change in the HN design rules. This review commenced in 2010, as part of SQA's routine review of HN awards.

HNC Computing is one of SQA's most popular HN awards. The table below provides information on uptake since 2001.

[1] All future references to 'QDT' in this document refer to the core members (only) unless otherwise stated.

Year	Registrations	Awards
2004/2005	389	78
2005/2006	993	377
2006/2007	927	526
2007/2008	827	485
2008/2009	952	552
2009/2010	842	576
2010/2011	819	579

Table 1: HNC Computing statistics

The popularity of this award has remained largely constant during a period of significant decline in the uptake of most other Computing/IT qualifications.

1.3 Reason for combining HNC Computing with HNC Computer Networking

During the initial public consultation, the decision was made to combine the reviews of HNC/HND Computing and HNC/HND Computer Networking, which were scheduled to take place at the same time (2010–2012).

This meeting also proposed that the respective HNCs (HNC Computing and HNC Computer Networking) were combined into a new single award (called 'HNC Computing') that covered both skill sets. This view was endorsed by the QDT when it convened for its first meeting in August, 2010.

The uptake figures for HNC Computer Networking are given in Table 2.

Year	Registrations	Awards
2004/2005	56	9
2005/2006	72	39
2006/2007	99	42
2007/2008	113	61
2008/2009	116	90
2009/2010	150	122
2010/2011	89	62

Table 2: HNC Computer Networking statistics

The rationale for combining the HNCs is given below.

- A generic HNC would serve the purpose of both pathways.
- Few students ended their studies with either HNC; the majority progressing to an HND.
- Specialisation took place at HND (not HNC) level.
- Delaying the choice of specialisation would give learners more time to decide on a specialism.

2 Rationale for the revision of the Group Award

2.1 Background to the development

This award was last validated in 2004. The review commenced in 2010, as part of SQA's quinquenial review process.[2]

The existing award is generally liked, and widely used, by centres. However, this area is subject to rapid change, in terms of technology and the skill base required by IT professionals.

In addition to updating the contents of the existing award, the review also sought to address recognised issues with the current award. These are:

1 **Achievement rates**: HNC Computing has a lower pass rate than most other HNC awards.

2 **Level of demand**: the number of Level 8 Units is higher than in most other HNC awards.

3 **Assessment load**: the amount of assessment has been criticised by teachers and learners.

It was a specific aim of the development to address these issues.

2.2 The HNC Computing development

The HNC Computing development began in June 2010 with a public consultation meeting, attended by 58 representatives, spanning 32 colleges. The main milestones are given below.

Date	Milestone
June 2010	Public consultation event
August 2010	QDT meeting
September 2010	Election of lead developer
November 2010	Heads of Computing event (consultation)
December 2010	QDT meeting Election of Qualification Leaders[3]
January 2011	QDT meeting
February 2011	QDT meeting
March 2011	QDT meeting Sector Panel meeting (consultation)

[2] SQA seeks to review HN awards every five years. This award was, therefore, due to be reviewed in 2009. It was delayed until 2010 to permit sufficient resources to be assigned to it.

[3] The role of the Qualification Leader (QL) was to assist the Lead Developer (LD) in the context of a specific award. There was a LD for each qualification. Janice Maxted is the QL for HNC Computing.

April 2011	Draft frameworks (all awards) Online survey opens
May 2011	Online survey closes Progress letter sent to centres QDT meeting Unit writers' training
June 2011	Subject Network event (consultation)
July 2011	Unit writers selected
August 2011	Meeting with vendors (consultation) Frameworks finalised (all awards) Unit writing commenced
September 2011	Unit writers drop-in event
October 2011	QDT meeting Unit writing completed
November 2011	Unit validation
December 2011	Group Award validation event

Table 3: Qualification development milestones

This Arrangements Document represents the culmination of a great deal of consultation and deliberation over the contents of the award.

2.3 Initial review phase

The initial review phase commenced in June 2010 and involved extensive consultation and discussion with the sector.

One major finding during this phase was the sector's preference for a single development that encompassed Computing and Networking. HN Computing is a family of awards consisting of: HNC Computing, HND Computing: Software Development, and HND Computing: Technical Support. The QDT, supported by Heads of Computing, wanted the review of these awards to embrace the review of HN Computer Networking, which was also due to commence (as a separate development). As a result, the 'HN Review', as it was known, encompassed five awards:

1 HNC Computing
2 HND Computing: Technical Support
3 HND Computing: Software Development
4 HNC Computer Networking
5 HND Computer Networking & Internetworking Technology

Also, at this stage, it was agreed to combine the HNCs into a single award, and introduce a new HND award (HND Computer Science). The HN Review, therefore, sought to develop the following awards:

1 HNC Computing (based on HNC Computing and HNC Computer Networking).
2 HND Computer Science (new award).
3 HND Computing: Technical Support (based on existing award).
4 HND Computing: Software Development (based on existing award).
5 HND Computing: Networking (based on HND Computer Internetworking).

This document relates (only) to the first award (the new HNC Computing). The rationale for the HNDs will be presently separately at a future validation event, and, as such, is outwith the scope of this document.

The QDT's rationale for combining the HNCs into a single award is provided under Section 1.3.

Stakeholders were engaged throughout the initial review stage. This was done in a number of ways including:

- Extended QDT, which included representatives of 23 colleges.
- On-going feedback and consultation with the sector through a variety of channels (including a web log[4] and update letters).
- On-going consultation with key stakeholders (see below).

The initial review stage concluded with a large scale (online) survey, which sought to gather feedback from a range of stakeholders about the proposed changes. Over 130 respondents completed this survey, representing college lecturers, university teachers, External Verifiers, HMIE and employers.

2.4 Consultation with employers

Consultation with employers took a variety of forms:

- Consultation with the Sector Panel for IT & Computing
- On-going consultation with the Sector Skills Council (E-Skills UK)
- Reference to a market appraisal carried out by SQA
- Consultation with vendors
- Online survey (see above)
- Interviews with specific employers

The Sector Panel for Computing & IT consists of a number of employer representatives, including *IS Scotland* and *Microsoft UK*. E-Skills UK is also represented on the Sector Panel. The HN Review was discussed at a number of Sector Panel meetings between March 2010 and October 2011. The minutes of the meetings record the Panel's support for QDT's proposals.

[4] The entire development was recorded via a web log available at http://hnreview.blogspot.com

Sector Skills Council input was captured in various ways. In addition to representation (and consultation) on the Sector Panel (see above), the independent consultant who served on the validation panel has extensive links with the SSC, and the final version of this document was sent to the Council for its approval.

In March 2010, SQA undertook a market appraisal of the IT and telecommunications sectors in the UK as part of its on-going business development activities. This detailed meta-analysis confirmed the key role that the IT sector plays within the Scottish and UK economies. The key findings reported in the appraisal were:

- IT and telecoms represents 5% of the Scottish economy
- IT and telecomm work comprised 4% of all Scottish employment
- One quarter (24%) of Scottish employers reported gaps in their IT user skills
- Projected annual growth in IT-related employment in Scotland between 2009–2018 is 0.7% (compared to 0.02% for all sectors)

A special meeting of vendors was convened in August 2011 to discuss the new awards and, specifically, the contribution of vendor awards to the qualifications. The proposals were approved by all present, which included Oracle, Microsoft, CIW and CompTIA.

2.5 Consultation with higher education establishments

The consultation with Higher Education (HE) took two forms:

- One-to-one interviews with a number of university representatives
- Online survey

The Lead Developer met with representatives of the Highlands & Islands University, University of the West of Scotland, Abertay University, Dundee University, Napier University, Heriot Watt University, Caledonian University and Robert Gordon University. These meetings consisted of face-to-face discussions about the proposed or planned changes to the existing provision. The proposed changes were supported in every interview.

In addition to this qualitative research, a number (9) of HE representatives completed the online survey. There was general support for the proposals. Specifically, there was support for the following:

- Title of the award (100%)
- Aims of the award (100%)
- Core Skill profile (100%)
- Articulation and progression (100%)
- Contents of the award (75%)
- Use of an examination for the Graded Unit (80%)

2.6 Consultation with professional and industry bodies

As previously noted, both *Scotland IS* and *E-Skills UK* are represented on the Sector Panel for Computing & IT, which considered these proposals at two meetings. *E-Skills UK* was also engaged on additional occasions, including representation on the validation panel. In addition to these two industry bodies, the final version of this document was reviewed by the representative of the British Computer Society (BCS)[5] on the Sector Panel for his review and comment, which was well received.

2.7 Links to STEM

The award was developed during a period of significant focus on STEM (Science, Technology, Engineering, and Mathematics) subjects in the UK. Computing is a STEM subject and, as such, this award will contribute to increased participation in this area within Scotland.

In conjunction with the focus on STEM in general, there has been a particular focus on computer science within the UK. Various parties, including the UK government, have emphasised the importance of skills in computer science to the UK economy.

The award was devised to address these on-going issues. The technical nature of both underpinning HNCs (HNC Computing and HNC Computer Networking) has been retained. For example, *Computer Systems Fundamentals* is a mandatory Unit. The new HNC requires students to acquire skills in software development (*Developing Software: Introduction* is a mandatory Unit), which was not a requirement in either of the two legacy awards.

The QDT believes that the revised HNC Computing award will make a tangible contribution to Scotland's STEM objectives, and also address concerns relating to software skills among the Scottish workforce.

2.8 Relationship with Curriculum for Excellence

The award was developed during the *Curriculum for Excellence (CfE)* programme, which is on-going at the time of writing. However, the development was able to encompass the principles of CfE, particularly the principles relating to breadth, progression, choice and relevance.

A member of the QDT was given special responsibility for ensuring the QDT's work was compatible with CfE. The SQA manager with special responsibility for the new Computing Science arrangements was consulted throughout this development.

The proposals are compatible with CfE in a number of practical ways. The entry requirements are expressed in terms of new qualifications. The inclusion of a software development Unit, in the mandatory section of the award, is consistent with the CfE focus on computing science. And the inclusion of a number of Core Skills supports the principle of breadth.

[5] Now known as *The Chartered Institute for IT*.

2.9 Summary of consultations and market research

The key findings from the qualitative and quantitative market research were:[6]

- Support for the new award (95%)
- Support for the title of the award (98%)
- Support for the aims of the award (97%)
- Support for the structure of the award (82%)
- Support for the choice of Graded Unit (79%)
- Support for the Core Skill profile (94%)
- Support for the articulation goals (91%)

These results confirmed the overall support for the proposed changes from all stakeholders.

3 Aims of the Group Award

3.1 Title of Group Award

The title of the award is HNC Computing. This title was chosen for several reasons including:

- Continuity with existing titles
- Accurate summary of the contents of the revised award
- Stakeholder support for this title

'HNC Computing' has been offered by SQA since 1978 and has, therefore, established a considerable reputation during that time. The revised HNC was designed to combine the competences of two existing HNCs (HNC Computing and HNC Computer Networking) and, as such, covers a broad range of computer-related knowledge and skills. There was overwhelming stakeholder support for this title, with over 95% of all stakeholders supporting this title.

[6] Figures in brackets are the responses (from all respondents) to specific questions in the online survey.

3.2 General aims of the Group Award

The following aims were supported by all stakeholders (97%). The Sector Panel (which includes a significant number of employers) also supported the aims.

The general aims of this award are to:

1 Develop candidates' knowledge and skills in planning, developing and evaluating.
2 Develop employment skills, particularly relating to the IT industry.
3 Enable progression within the SCQF.
4 Develop study and research skills.
5 Develop learning and transferable skills (including Core Skills).
6 Provide academic stimulus.
7 Support candidates' continuing professional development.

3.3 Specific aims of the Group Award

The specific aims of this award are to:

8 Update the contents of the award to reflect current professional practices and technologies.
9 Update the contents of the award to incorporate best practice in assessment, including a reduction in time spent on assessment and maximising the use of e-assessment.
10 Maximise flexibility (while maintaining coherence) in qualification design to permit centres to customise the award to their local needs.
11 Reduce the academic level of the award (in terms of SCQF levels).
12 Produce Units that are able to embrace external changes without regular updates.
13 Produce awards that are compatible with a wide range of vendors.

Progression to degree courses is particularly important for students who undertake this award due to the high number of students who progress from the HNC (or HND) to degree programmes.

3.4 Relationship of mandatory Units to aims of the HNC

The aims of the award are met within the mandatory Units and a selection of optional Units of this award. A table showing where the individual aims are met within Units is provided in Appendix 2.

3.5 Target groups

The primary target groups for this award are:

- School-leavers who wish to undertake a specialised, vocational qualification with a view to progressing to university or employment.
- Unemployed adults who wish to retrain in this vocational field with a view to finding employment.
- Adults in employment who wish to change career.

It should be noted that all of these groups, irrespective of their reasons for undertaking this award, may have to progress to university due to the highly competitive nature of this employment sector and its preference for graduate entry.

4 Access to Group Award

4.1 Access to the award

This statement is about access to the Group Award as a whole. However, in addition to the detail which follows, part of the specification of each and every HN Unit includes recommended access levels. Students should normally be expected to satisfy both sets of access requirements.

As with all SQA qualifications, access will be at the discretion of the centre. The following recommendations are for guidance only.

Some examples of appropriate formal entry qualifications are specified below. They are not exhaustive or mutually exclusive and may be offered in a variety of combinations.

4.2 Formal qualifications

Entry to this award is at the discretion of the centre. However, the following examples illustrate qualifications that may be considered suitable for entry.

1 National Certificate in Digital Media Computing at SCQF level 5 or level 6 or a combination of both.

2 Any two relevant National Courses at Higher together with three Standard Grade/Intermediate passes.

3 Any two relevant new National Courses at Higher, based on the *Curriculum for Excellence*, together with three passes at National 5 level in appropriate subjects.

4 An SVQ at level 2 or 3 in Information Technology or other relevant area.

5 Relevant National Progression Awards or National Units at appropriate levels combined with any of the above.

Different combinations of relevant National Qualifications, Vocational Qualifications and equivalent qualifications from other awarding bodies may also be acceptable, as would suitable vendor qualifications at an appropriate level.

4.3 Work experience

Mature candidates with suitable work experience may be accepted for entry provided the enrolling centre believes that the candidate is likely to benefit from undertaking the award.

It would be advisable for all candidates to have some prior knowledge of computing or information technology although formal qualifications may not be necessary if suitable experience had been gained informally or through work experience.

Such work experience may provide inferred or actual evidence of a candidate's skills and knowledge as they apply either to particular HN Units or to the required Core Skills which are listed in the next section.

4.4 Recommended Core Skills Entry Profile

The recommended Core Skill profile for entry to this award is defined in Table 4.

Core Skill Units	Recommended Entry
Communication	Intermediate 2 (SCQF 5)
Information and Communication Technology (ICT)	Intermediate 2 (SCQF 5)
Numeracy	Intermediate 2 (SCQF 5)
Working with Others	Intermediate 2 (SCQF 5)
Problem Solving	Intermediate 2 (SCQF 5)

Table 4: Core Skill entry profiles

It is recognised that some candidates, particularly adult returners, may not possess a specific Core Skills profile on entry, hence entry level is only recommended. In this case, it is recommended that centres carry out an appropriate evaluation of the learner's basic skills to ensure that they have the necessary prerequisites to benefit from undertaking this award.

5 Group Award structure

5.1 Structure of HNC

In order to achieve the HNC Computing award, the candidate must achieve **6 mandatory credits** and **6 optional credits**.

The decision to require the minimum number of mandatory credits, consistent with the design principles, was taken to maximise centre choice in customising the award to suit local needs, which was one of the aims of the award.

The mandatory Units were selected for a number of reasons including:

- Deliver key computing skills, such as software development
- Deliver key knowledge of the subject, such as computer fundamentals
- Deliver essential knowledge of the IT industry, such as ethics in computing
- Deliver transferable skills, such as team working

It was the consensus of the QDT and Heads of Computing to develop a single HNC Computing framework leading to four distinct HND awards in Technical Support, Software Development, Networking and Computing. This decision provided an opportunity to take a fresh look at the mandatory section of the award and develop a combination of Units which would allow candidates to experience and acquire knowledge of the basic skills required of a computing professional. The specialist knowledge leading to a specific HND would be gained from the selection of appropriate optional Units.

In present day Scotland, the majority of businesses are small to medium sized enterprises many of whom lack the funds to employ a number of specialists. They could, however, employ an individual with good general computing skills. The mandatory Units were chosen to cover both the technical and professional skills required for working within the computing industry.

A computing professional has to be aware of contemporary legislation, ethical considerations, codes of conduct and professional bodies which would provide opportunities for personal development and support in their career. The Professionalism and Ethics in Computing Unit aims to cover these topics.

The development of software has become a necessary part of many job functions with the industry and is no longer the remit solely of programmers. For example, technical support and networking professionals may require to write and test scripts to automate various tasks. The Introduction to Developing Software Unit will provide all candidates with the basic skills to design, implement and test simple programs and produce technical documentation.

Although hardware and software are continually changing, an understanding of the physical, software and logical elements of a computer is required along with the along with the basic skill of installing and configuring various types of software. The *Computer Systems Fundamentals* Unit is aimed at providing this knowledge and experience as well as an appreciation of the interaction between hardware and software and the impact various elements may have on system performance.

For the majority of computing professionals team working is the norm and this essential skill is developed through the *Team Working in Computing* Unit. Computing professionals may also spend much of their time troubleshooting be it a technical, software or logic problem. By contextualizing the delivery of the *Team Working in Computing and Troubleshooting Computing Problems* Units opportunities arise to develop both the underpinning skills for a specific HND specialism and to deepen the core computing skills of the learners.

The mandatory Units will provide an opportunity to embed several of the Core Skills at level 5/6.

A large majority of respondents to the survey voted for an examination as their preferred option for the Graded Unit which will examine all the other mandatory Units with the exception of *Team Working in Computing*.

5.2 Framework

Mandatory Units — Total of 6 credits

Candidates must pass all of the following Units.

Unit title	Code	SCQF credit points	SCQF level	SQA credit value
Computer Systems Fundamentals	H175 34	8	7	1
Developing Software: Introduction	H173 34	8	7	1
Professionalism and Ethics in Computing	H1F7 34	8	7	1
Team Working in Computing	H178 34	8	7	1
Troubleshooting Computing Problems	H177 34	8	7	1
HNC Computing: Graded Unit 1 (Exam)	H1J8 34	8	7	1

Optional Units — Total of 6 credits

Candidates must select a minimum of six credits from this section, which is divided into three sub-sections:

Optional group 1: Vocational Units (up to six credits)
Optional group 2: Mathematics Units (up to two credits)
Optional group 3: Vendor Units (up to three credits)
Optional group 4: Local Options (up to two credits)

The reason for grouping the optional section is to prevent candidates from selecting too many mathematics and/or vendor credits. Candidates can choose any combination of these groups, consistent with these rules of combination.

Unit title	Code	SCQF credit points	SCQF level	SQA credit value
Group 1 – 'Vocational' Options (Up to 6 credits)				
Using Software Applications Packages*	D85F 34	8	7	1
Information Technology: Applications Software 1*	D75X 34	8	7	1
Computing: Planning*	DH35 34	8	7	1
Big Data*	H8W8 34	8	7	1
Data Science*	H8W9 35	16	8	2
Private Cloud Virtualisation*	H8N5 35	8	8	1
Building an e-Business	F6JJ 34	8	7	1
Client Operating Systems	H1EM 34	16	7	2
Cloud Computing	H179 34	8	7	1
Digital Forensics*	J0HL 34	8	7	1
Computer Hardware: Hardware Installation & Maintenance	H1FY 34	16	7	2

Unit title	Code	SCQF credit points	SCQF level	SQA credit value
Group 1 – 'Vocational' Options (Up to 6 credits)				
Computer Networking: Fundamentals	H17A 34	8	7	1
Computer Networking: Practical	H17B 34	8	7	1
Computer Networks: Building Local Area Networks	H17C 34	16	7	2
Computing: Introduction to Project Management	H17D 34	8	7	1
Computing: PC Hardware and Operating System Essentials	H17E 34	8	7	1
Computing: PC Hardware and Operating System Support	H17F 34	8	7	1
Configuring a Desktop Operating System	FK89 34	16	7	2
Convergence Technologies	H17G 35	16	8	2
Database Design Fundamentals	DV6E 34	8	7	1
Databases: Introduction	H17H 34	8	7	1
Developing Mobile Web Based Applications: An Introduction	HF4Y 34*	16	7	2
Digital Culture: Online Collaboration	F86V 35	8	8	1
Digital Culture: Online Communications	F86P 34	8	7	1
Digital Culture: Web 2.0 Applications	F86T 33	8	6	1
E-Commerce: Publishing Web Sites	DV6G 34	16	7	2
Entrepreneurship in the Creative Industries	DR0T 35	8	8	1
*Ethical Hacking	J0HK 34	8	7	1
*Preparing to Start a Business	H7V4 34	8	7	1
Handling Information as a Resource	H17K 34	8	7	1
Human Computer Interaction	H17L 34	8	7	1
Intrusion Prevention Systems	H17M 34	8	7	1
Information Technology: Information Systems and Services	H1G0 34	8	7	1
Mail Server Management	H17N 34	8	7	1
Managing a Web Server	H17P 34	8	7	1
Mobile Technology	H17R 35	8	8	1
Multi User Operating Systems	DH3A 34	8	7	1
Multimedia: Developing Multimedia Applications	DH2R 34	16	7	2
Network Concepts	H17S 34	16	7	2
Personal Development Planning	DE3R 34	8	7	1
Project Management for IT	F1W0 34	8	7	1
Providing Support to Users	H17T 34	8	7	1
Relational Database Management Systems	H16W 35*	16	8	2

Unit title	Code	SCQF credit points	SCQF level	SQA credit value
Group 1 – 'Vocational' Options (Up to 6 credits)				
Network Security Concepts	HT9G 34*	16	7	2
Software Development: Developing Small Standalone Applications	H17W 34	16	7	2
Software Development: Programming Foundations	H17X 34	8	7	1
Professional Career Development in the IT Industry	HG1K 34	8	7	1
Website Design, Planning & Design,	FW5C 34*	8	7	1
Website Design, Multimedia Content Creation	FW5D 34*	8	7	1
Website Design, Development Technologies	FW5E 34*	8	7	1
Data Security	J0H9 34*	8	7	1
Data Flow	J27L 34*	8	7	1
Emerging Technologies and Experiences	HF85 34*	8	7	1
Artificial Intelligence	HT9T 34*	8	7	1
Computer Programming	J0HA 34*	8	7	1
Cyber Resilience	HT9V 34*	8	7	1

*Refer to History of Changes for revision changes.

Unit title	Code	SCQF credit points	SCQF level	SQA credit value
Software Development: Systems Foundations	H17Y 34	16	7	2
SQL: Introduction	DH3J 34	8	7	1
Systems Development: Introduction	H180 34	8	7	1
Systems Development: Testing Software	H181 34	8	7	1
Systems Development: User Centred Design	H182 34	8	7	1
Technical Support: Supporting Users – Hardware	H183 34	8	7	1
Technical Support: Supporting Users - Software	H184 34	8	7	1
Troubleshooting a Desktop Operating System	FK8A 34	16	7	2
User Interface Design	HF55 34*	8	7	1
Web Development: Essential Content	HF58 34*	16	7	2
Work Role Effectiveness	DG6E 34	24	7	3
Work Role Effectiveness	DG6G 35	24	8	3
Working in IT	H185 35	16	8	2
Workplace Communication in English	H8T2 33*	8	6	1
Digital Skills	H9DE 34	8	7	1
Software Development: Event Driven Programming	DH34 35	16	8	2
Machines, Languages & Computation	HH7W 34	16	7	2
Computer Systems and Organisation	HH7V 35	8	8	1
Routing Technology	FR22 35*	16	8	2
Networking Technology	FR24 35*	16	8	2
Bring Your Own Device (BYOD): Introduction	H6D0 34*	8	7	1
Cryptography: Practical Applications	J4BF 34*	8	7	1
Application Security	J4BG 34*	8	7	1
Software Security	J4BH 34*	8	7	1
Communicating with Data	J4Y5 34*	8	7	1
Working with Data	J4Y4 34*	8	7	1
Group 2 — 'Mathematics' Options (Up to 2 credits)				
Mathematics for Computing	A5P0 35	8	8	1
Mathematics for Computing 1	D76E 34	8	7	1
Mathematics for Computing 2	D76F 35	8	8	1
Mathematics for Interactive Computing: Essential Techniques	F20B 34	8	7	1
Mathematics: Calculus and Matrices for Computing	DP8F 34	8	7	1
Engineering Mathematics 4	H7K3 35*	8	8	1

Unit title	Code	SCQF credit points	SCQF level	SQA credit value
Statistics for Science 1	DH34 35*	8	6	1

Unit title	Code	SCQF credit points	SCQF level	SQA credit value
Group 3 — 'Vendor' Options (Up to 3 credits)				
Technical Specialist: Windows Server 2008: Network Infrastructure, Configuring	H1HF 34	30	7	3.5
Technical Specialist: Windows Server 2008: Applications Infrastructure, Configuring	~~H1HG 34~~	24	7	3
Technical Specialist: Deploying and Maintaining Windows Vista Client and Microsoft 2007 Office Desktops	~~HIHK 34~~	15	7	1.5
Technical Specialist: Configuring Microsoft Windows Vista Client	H1HJ 34	15	7	1.5
Technical Specialist: Windows 7: Configuring	H1HR 35	24	8	3
Technical Specialist: Windows Server 2008: Active Directory Configuring	H1HH 35	35	8	4
IT Professional: Windows Server 2008: Server Administrator	H1HL 36	15	9	1.5
IT Professional: Windows Server 2008: Enterprise Administrator	H1HM 36	40	9	5
Technical Specialist: Web Applications Development with Microsoft .NET Framework 4	H1HP 35	30	8	3.5
Technical Specialist: Windows Communication Foundation Development with Microsoft .NET Framework 4	H1HS 36	9	9	1
Technical Specialist: Windows Applications Development with Microsoft .NET Framework 4	H1HT 36	15	9	1.5
Technical Specialist: Accessing Data with Microsoft .NET Framework 4	H1HV 35	15	8	1.5
Technical Specialist: Microsoft SharePoint 2010, Application Development	H1HW 36	15	9	1.5
Database Design and Programming in SQL*	H4KJ 34	15	8	1.5
Database Programming with PL/SQL*	H4KP 35	15	9	1.5
Group 4 — Local Option (Up to 2 credits)				
Web Development Fundamentals	F203 34	8	7	1
Compositing and Motion Graphics	H4JN 34	8	7	1
Self Describing Data (XML)	FM97 35	8	8	1
Big Data	H8W8 34	8	7	1
Web technologies 1: HTML and CSS	HF3K 34	8	7	1

Unit title	Code	SCQF credit points	SCQF level	SQA credit value
Software Development: Object Oriented Programming	H171 35	16	8	2
Switching Technology	FR23 34*	8	7	1

*Refer to History of Changes for revision changes.

5.3 Vendor pilot

SQA has agreed to participate in a pilot project to evaluate the feasibility of directly accrediting vendor qualifications within this award. This pilot has the approval of SQA's Qualification Committee, chaired by the Director for Qualifications.

Previously, vendor qualifications were accredited through credit transfer, whereby shadow Units were created, based on vendor curricula, and candidates were awarded these [SQA] Units on the basis of their vendor achievements. However, this system placed the onus on SQA to revise these shadow Units whenever vendors changed their certifications.

The pilot programme places the responsibility for recognition on to the vendors. Vendors are required to credit and level their qualifications using SCQF, and then propose these awards for inclusion in this framework. Their inclusion, or otherwise, will be decided by the appropriate Qualifications Support Team.[7] Figure 1 illustrates the process of vendor accreditation.

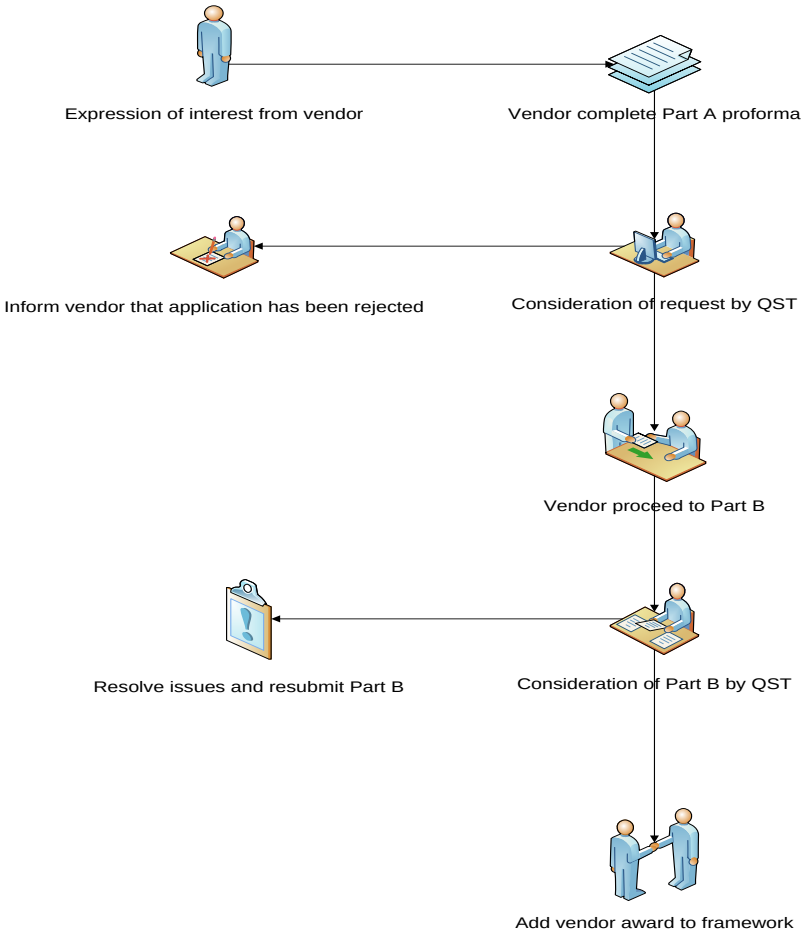

Figure 1: Vendor accreditation process

[7] During the development phase, the QDT will decide on the inclusion of specific vendor qualifications. This task will be taken over by the QST once the award is operationalised.

The Qualifications Committee imposed a cap on the contribution of vendor awards to national qualifications. The cap is 25% (three credits for an HNC). This limit applies to all vocational qualifications with direct recognition of third party awards, based on SCQF. This rule will be reviewed when the pilot is reviewed.

It is the responsibility of each vendor to accredit their awards on SCQF. This may be done by any one of the SCQF-accreditation bodies in Scotland.

Group 3 of the HNC framework shows the accredited vendor qualifications at the time of writing this document. It is anticipated that more vendor awards will be added as and when they are accredited through this process.

When a specific vendor award is accredited but found to be similar to an existing (generic) HN Unit, these Units (the vendor Unit and the HN Unit) will be grouped into an excluded combination to ensure that candidates cannot double count their knowledge or skills.

All decisions regarding the accreditation of vendor Units (for inclusion in this framework) and excluded combinations will be made by the Qualifications Support Team for HN awards.

This pilot programme will be evaluated in Summer 2013, when final decisions will be made regarding its continuation.

5.4 Mapping information

5.4.1 National Occupational Standards within Units

Reference to the appropriate National Occupational Standards (NOS) was made throughout the development process. The Standards with most applicability to this development are:

1 IT and Telecoms (QCF Levels 1-5/SCQF levels 4–8).
2 IT Users (QCF Levels 1–3/SCQF levels 4–6).

Both sets of Standards are relevant to the contents of this award and were full considered throughout the development. Appendix 3 illustrates how NOS are embedded in this award.

5.5 Articulation, professional recognition and credit transfer

5.5.1 Progression to HND

Progression from the HNC to any of the afore-mentioned HNDs can be gained by achieving the HNC award. The HNC is achievable with 12 credits; however, it is recommended that candidates wishing to progress to the HND should achieve 15 Units whilst studying for the HNC. The selection of these additional (three) credits is done at local or regional level.

5.5.2 Progression to higher education

The following universities were consulted during the development of this award:

1 Abertay University
2 Caledonian University
3 Dundee University
4 Heriot Watt University
5 Highlands & Islands University
6 Napier University
7 Robert Gordon University.
8 University of the West of Scotland

All of these institutions agreed to consider candidates who possessed the HNC award for entry to first year or direct entry to year two of their degree programmes. There are no specific articulation arrangements for any particular university. However, all of the above universities were consulted about the structure of the HNC award and supported the current proposal. It is normal practice, in this area, for universities to agree formal articulation arrangements at a regional level, with local colleges.

The current framework includes sufficient options to permit such local arrangements to be created. For example, a number of Mathematics Units are included to facilitate progression to degree courses where maths proficiency is a prerequisite.

5.5.3 Other related qualifications

In addition to having value in its own right, this award was designed to serve as the first year of the following HND qualifications:

1 HND Computer Science (new)
2 HND Computing: Software Development
3 HND Computing: Technical Support
4 HND Computing: Networking

These HND awards will be validated towards the end of 2012.

The HNC was also designed to articulate with appropriate National Certificates and degree courses. Figure 2 illustrates potential articulations and progressions.

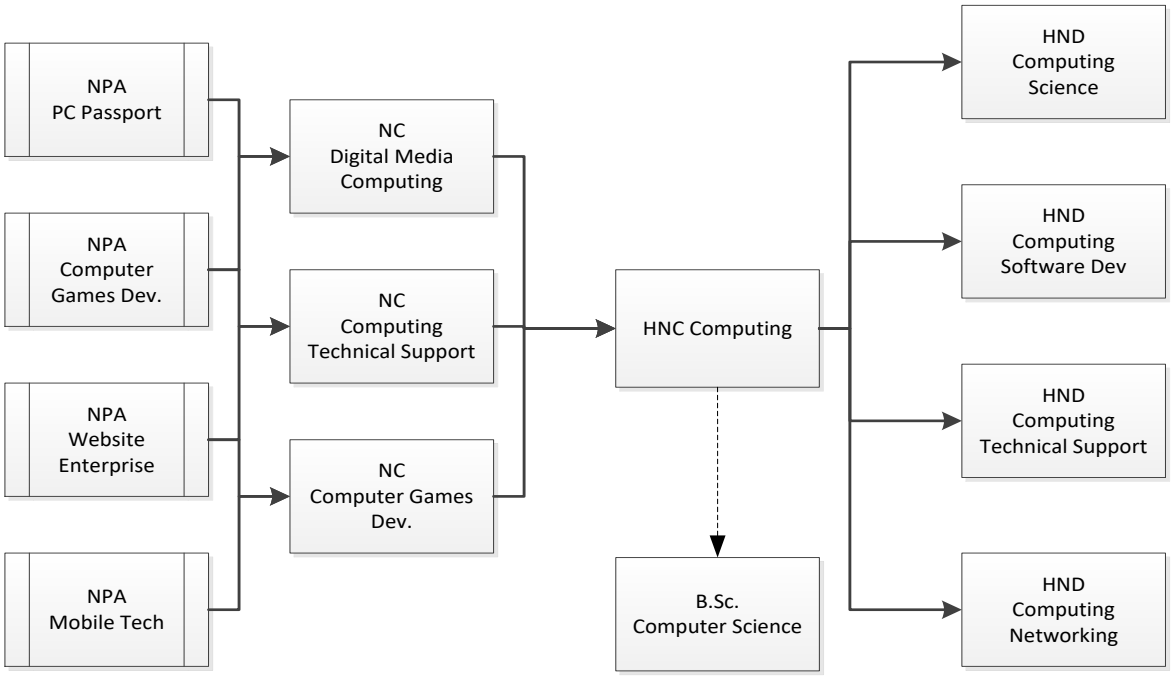

Figure 2: Articulation and progression

5.5.4 Transition arrangements

HN awards in Computing have a long tradition of providing detailed guidance on credit transfer between existing and new awards.[8] This is done, at the request of centres and External Verifiers, to ensure consistency between centres. Credit transfer tables have been provided in this subject area since 1995. However, final decisions relating to credit transfer lies with centres.

Appendix 4 will be populated with equivalent Units once these pairings have been approved by an External Verifier (normally the Senior External Verifier). The External Verifier uses specific criteria to determine when two Units are equivalent and one can provide credit for another. Many of the 'new' (2011) Units in this table are revisions of the 'old' (2004) Units, making credit transfer more credible and easier to identify.

Units completed prior to 2004 are not eligible for credit transfer into the new framework due to the importance of contemporary skills in this sector.

[8] Standard SQA policy is to permit centres to decide on credit transfer.

6 Approaches to delivery and assessment

6.1 Content and context

The contents of the revised HNC have been updated to reflect contemporary technologies and methodologies. Since the creation of the current award, in 2004, a number of technological developments have taken place, including:

- Virtualisation
- Growth of Web 2.0 technologies
- Increase in social media
- Increase in mobile technology
- Increased focus on software development

The revised award seeks to embrace these technological changes.

The award may be delivered full-time or part-time. It is hoped to develop online learning materials for some, or all, of the Units at a later date.

There is no defined sequence of delivery as the award is designed to allow centres as much freedom of choice in choosing from many optional Units.

The reduction in time spent on assessment is an important aim of this review. Assessment in an HNC will cover a variety of knowledge and practical skills as well as the more intellectual skills of planning and evaluating. These together with the Core Skills mean that a large number of different methods are employed to ensure that a student ‘can do what s/he is supposed to do' and 'knows what s/he is supposed to know’.

A large proportion of Units take a ‘project’ approach using the product of a previous assessment, as the foundation of the next and the purpose is to give the candidate a true reflection of how items being studied integrate and relate to industrial practice. Where this is practical, a holistic approach is encouraged to be taken by centres in assessing across a number of Outcomes within Units or across a number of Units.

The benefit of such so-called ‘cross-assessment’, if it goes well, is the achievement of several Outcomes on several Units with just one assessment instrument. A matching disadvantage is that a failure results in several Units not being achieved. It would be wise for centres to consider separating out the 'retake' assessments of students who have failed in their first attempt at a composite assessment instrument.

It may be possible to combine the delivery of Units in such a way as to create a thematic delivery of the component Units. The ways in which Units may be integrated is left to centres but thematic delivery, as opposed to discrete Unit delivery, may reduce assessment and improve coherence of content.

The normal rules of re-assessment apply to this award. Candidates are normally permitted one re-assessment, or, in exceptional circumstances, two re-assessments at the discretion of the centre.

6.2 Guidance on Open Learning

Full details on the suitability of individual Units for Open Learning are contained in each individual Unit specification. Overall the Qualification Design Team are aware that aspects of many Units could be delivered on an Open Learning basis but that special arrangements would be required to ensure that any assessments were the candidate's own work.

These awards may be delivered by open and distance learning methods, provided that adequate preparations are made. There is an intrinsic difficulty if specialised equipment is required, but companies, other agencies and even the student him or herself may be able to make suitable equipment available. While learning may often progress well, it is often the case with practical skills assessments that a centralised testing facility is needed, for example the FE college or centre itself. Alternatively, as with on-job assessment in SVQs, an assessor may need to visit the candidate's work location and administer the test, having first had time to check and prepare the local equipment.

6.3 Pathways from HNC to HND awards

The following tables are the suggested pathways from HNC Computing to each of the proposed HND Computing awards.

HNC Computing ⇨ HND Computer Science	SCQF Level	Credit(s)
All Mandatory HNC Computing Units (6 credits) plus		
SQL: Introduction	7	1
e-Commerce: Publishing Websites	7	2
Managing a Web Server	7	1
Database Design Fundamentals	7	1
Human Computer Interaction	7	1
Software Development: Developing Small Stand Alone Applications	7	2
Computer Networking Fundamentals	7	1

HNC Computing ⇨ HND Computing: Technical Support	SCQF Level	Credit(s)
All Mandatory HNC Computing Units (6 credits) plus 9 credits from the Units listed below		
Client Operating Systems	7	2
Cloud Computing	7	1
Computer Networking: Fundamentals	7	1
Computer Networks: Building Local Area Networks	7	2
Computing: PC Hardware and Operating Systems Essentials	7	1
Computing: PC Hardware and Operating Systems Support	7	1
Convergence Technologies	8	2
Managing a Web Server	7	1
Multi User Operating Systems	7	1
Technical Support: Supporting Users – Hardware	7	1
Technical Support: Supporting Users – Software	7	1

HNC Computing ⇨ HND Computing: Software Development	SCQF Level	Credit(s)
All Mandatory HNC Computing Units (6 credits) plus		
Software Development: Developing Small Stand Alone Applications	7	2
Plus 7 credits from the Units listed below		
Software Development: Programming Foundations	7	1
Software Development: Systems Foundations	7	2
SQL: Introduction	7	1
Systems Development: Introduction	7	1
Systems Development: Testing Software	7	1
Systems Development: User Centred Design	7	1
Database Design Fundamentals	7	1
Databases: Introduction	7	1

HNC Computing ⇨ HND Computing: Networking	SCQF Level	Credit(s)
All Mandatory HNC Computing Units (6 credits) plus		
Computer Forensics Fundamentals	7	1
Computer Networking: Fundamentals	7	1
Computer Networking: Practical	7	1
Computing: PC Hardware and Operating Systems Essentials	7	1
Computing: PC Hardware and Operating Systems Support	7	1
Mobile Technology	8	1
Project Management for IT	7	1
Troubleshooting a Desktop Operating System	7	2

6.4 Graded Unit information

The QDT selected an examination as the Graded Unit. An examination, rather than a project, was chosen for several reasons, including:

- **Continuity**: HNC Computing has used an examination since the inception of Graded Units in 2003.
- **QDT preference**: The QDT supported the use of an examination.
- **Stakeholder support**: Heads of Computing supported the use of an examination.
- **HE articulation**: an examination facilitates progression to degree courses, and was supported by HE in our consultations.
- **Employer preference**: employers expressed a preference for an examination.

The Graded Unit for this award is designed to provide evidence that the candidate has achieved the following principal aims of HN Computing:

- To develop the candidate's knowledge and skills such as planning, analysing and problem solving.
- To develop study and research skills.
- To prepare students for progression to further study in Computing or a related discipline.

The format of the Graded Unit comprises of three sections. Section 1 consists of 15 multiple choice questions, worth 15 marks, focussing on factual knowledge; Section 2 consists of one mandatory integrated question worth 15 marks focussing on the integration of knowledge across component Units and Section 3 consists of seven from eight extended response questions, worth 70 marks, also focussing on the integration of knowledge across component Units. Standard grading cut-offs will be applied.

6.5 Core Skills on Exit

Table 5 defines the Core Skills profile on exit from this award. The Core Skill entry and exit profiles were decided by the QDT.

	Recommended Entry	**Mandatory Exit**
Communication	Intermediate 2 (SCQF 5)	Higher (SCQF 6)
Information and Communication Technology (ICT)	Intermediate 2 (SCQF 5)	Higher (SCQF 6)
Numeracy	Intermediate 2 (SCQF 5)	Intermediate 2 (SCQF 5)
Working with Others	Intermediate 2 (SCQF 5)	Higher (SCQF 6)
Problem Solving	Intermediate 2 (SCQF 5)	Higher (SCQF 6)

Table 5: Core Skill entry and exit profiles

The recommended exit level Core Skills Profile is what the Qualification Design Team considered would denote the level of proficiency required to enable candidates to derive the maximum benefit from studying the HNC Computing award in terms of opportunities for further study (including Higher Education), personal development and employment.

Core Skills can be embedded or signposted within Units. Embedded is where the development of a Core Skill is incorporated into the Unit and where the Unit assessment also covers the requirements of Core Skill assessment at a particular level. Units that have embedded Core Skill(s) will be automatically certificated upon successful completion.

Signposted means identifying opportunities within the Unit for developing Core Skills other than those that can be summatively assessed and certificated. This allows the development of the Core Skills through teaching and learning to be utilised and these opportunities are highlighted within the Unit support notes to those delivering and managing the Units.

The Qualification Design Team have embedded the Core Skill of *Numeracy* at SCQF level 5 within the mandatory Unit *Computer Systems Fundamentals.*

The Core Skill of *Working with Others* and *ICT* at SCQF level 6 are embedded in the mandatory Unit *Team Working in Computing.*

The Core Skill of *Problem Solving* at SCQF level 6 is embedded in the mandatory Unit *Troubleshooting Computing Problems*. The Core Skill component of Critical Thinking which is part of the *Problem Solving* Core Skill is embedded within the mandatory Unit of *Developing Software: Introduction*.

The Core Skill of *Communications* at SCQF level 6 can be developed comfortably and naturally within the mandatory Units *Team Working in Computing and Professionalism and Ethics in Computing* but have been signposted rather than embedded.

7 General information for centres

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**.

Internal and external verification

All instruments of assessment used within this/these Group Award(s) should be internally verified, using the appropriate policy within the centre and the guidelines set by SQA.

External verification will be carried out by SQA to ensure that internal assessment is within the national guidelines for these qualifications.

Further information on internal and external verification can be found in *SQA's Guide to Assessment* **(www.sqa.org.uk)**.

8 General information for candidates

This award is designed to offer candidates academic, technical and professional training leading to the skills necessary to design, implement, support, evaluate or manage Computing systems in a vast range of industries. The award is targeted at candidates who have the formal education requirement and:

- who intend to leave school and further their career path in a college **OR**
- who intend to progress their career after the study of either the NQ in Computing, the NQ in Information Systems **OR**
- who leave employment with the intention of changing their career path **OR**
- who are unemployed and wish to study to assist gaining employment **OR**
- who wish to study on a part-time (day or evening) or day-release mode. However, this is not easy because most HNC students are full-time.

At the discretion of a centre, a candidate may be permitted to enter the award by waiving some of the entry requirements — based on their previous experience. Experience has shown that mature candidates often study this award after having succeeded at the HNC and perhaps having also achieved some vendor qualifications.

A candidate may move on to study at a higher level at a college or use the award to articulate to a degree course.

In order to achieve the HNC Computing Group Award the candidate must achieve 6 mandatory credits and 6 optional credits from Groups 1, 2 and 3.

Please note if choosing Units from Group 2 only a maximum of 2 credits can be taken. If choosing from Group 3 only a maximum of 3 credits can be taken.

The mandatory section of this Group Award incorporates 48 SCQF credit points at SCQF level 7 which satisfies the design principles.

Please note that no more than 25% of the Units within the award can come from **Group 3 — 'Vendor' Options (Maximum of 3 credits)** of the award.

These awards are designed to articulate into Higher Education in a multitude of award areas which have a hybrid content containing computing as a discipline. Formal articulation agreements have existed in the past and may well be set up in the immediate future between individual centres offering the HNC Computing awards and their feeder Higher Education institutions and this should be encouraged.

It should be possible for a candidate to articulate directly to the second year of some HE degree programmes. Typically such articulation will be limited in two ways:

1 The successful student will have taken at least some optional Units which are preferred by the target university. Without these, students may instead articulate only into the first year.

2 The target university may limit the range of degree programmes to which an HNC student may be given articulated access.

Examples of degree programmes where it should be possible for a candidate with HNC Computing to articulate directly under the SCQF are:

- BSc Computer Science
- BSc Multimedia
- BSc Information Management
- BSc Applications Development
- BSc Games Technology
- BSc Network Computing

The main objective of the award is progression to further study within the sector. Employment opportunities do exist although candidates will be aware that on completion of the award there will be varying numbers of other candidates completing at higher levels such as at HND or Degree level with the same area of study.

The award should be used to get students into part-time employment with small to medium sized businesses as potential technicians able to problem solve and be technically able to fix and repair different types of devices.

There are many examples of such candidates working in local and national businesses and the knowledge gained within the HNC is an excellent base from which candidates can go on to specialise in the different aspects of Computing.

9 Glossary of terms

SCQF: This stands for the Scottish Credit and Qualification Framework, which is a new way of speaking about qualifications and how they inter-relate. We use SCQF terminology throughout this guide to refer to credits and levels. For further information on the SCQF visit the SCQF website at **www.scqf.org.uk**

SCQF credit points: One HN credit is equivalent to 8 SCQF credit points. This applies to all HN Units, irrespective of their level.

SCQF levels: The SCQF covers 12 levels of learning. HN Units will normally be at levels 6–9. Graded Units will be at level 7 and 8.

Subject Unit: Subject Units contain vocational/subject content and are designed to test a specific set of knowledge and skills.

Graded Unit: Graded Units assess candidates' ability to integrate what they have learned while working towards the Units of the Group Award. Their purpose is to add value to the Group Award, making it more than the sum of its parts, and to encourage candidates to retain and adapt their skills and knowledge.

Dedicated Unit to cover Core Skills: This is a non-subject Unit that is written to cover one or more particular Core Skills.

Embedded Core Skills: This is where the development of a Core Skill is incorporated into the Unit and where the Unit assessment also covers the requirements of Core Skill assessment at a particular level.

Signposted Core Skills: This refers to the opportunities to develop a particular Core Skill at a specified level that lie outwith automatic certification.

Qualification Design Team: The QDT works in conjunction with a Qualification Manager/Development Manager to steer the development of the HNC/HND from its inception/revision through to validation. The group is made up of key stakeholders representing the interests of centres, employers, universities and other relevant organisations.

Consortium-devised HNCs and HNDs are those developments or revisions undertaken by a group of centres in partnership with SQA.

Specialist single centre and specialist collaborative devised HNCs and HNDs are those developments or revisions led by a single centre or small group of centres who provide knowledge and skills in a specialist area. Like consortium-devised HNCs and HNDs, these developments or revisions will also be supported by SQA.

10 Appendices

Appendix 1: Qualification Design Team (QDT) Members
Appendix 2: Mapping of aims to Units
Appendix 3: National Occupational Standards (NOS) Mapping
Appendix 4: Core Skills Mapping
Appendix 5: Credit transfer table

Appendix 1: Qualifications Design Team

Name	Position	Centre
Peter Ainsworth	Core QDT Member	Motherwell College
Peter Bradbeer	Core QDT Member	Adam Smith College
Caroline Douglas	Core QDT Member	SQA
Chris Deegan	Core QDT Member	City of Glasgow College
Bobby Elliott	Core QDT Member	SQA
Ted Hastings	Core QDT Member	Millennium City Academy
Chris Jones	Core QDT Member	Cumbernauld College
Gerry MacKie	Core QDT Member	Dundee College
Janice Maxted	Core QDT Member	Langside College
Willie McCabe	Core QDT Member	James Watt College
David McDade	Core QDT Member	Stow College
Shaun Miller	Core QDT Member	Edinburgh's Telford College
Anne Russell	Core QDT Member	Glasgow Caledonian University
Derek Summers	Core QDT Member	Perth UHI
Colin Thomson	Core QDT Member	Stevenson College
Tracey Bain	Extended QDT Member	Angus College
Robert Balfour	Extended QDT Member	Motherwell College
Brendan Burns	Extended QDT Member	Motherwell College
Richard Copeland	Extended QDT Member	Anniesland College
Frank Duffy	Extended QDT Member	Motherwell College
Ian Eyre	Extended QDT Member	Langside College
Vivien Gallacher	Extended QDT Member	Forth Valley College
Paul Holmes	Extended QDT Member	Motherwell College
Nigel Kennington	Extended QDT Member	Edinburgh's Telford College
Gillian Leitch	Extended QDT Member	Langside College
George McAteer	Extended QDT Member	Angus College
Gordon McPherson	Extended QDT Member	Inverness College
Margaret Millan	Extended QDT Member	Motherwell College

Name	Position	Centre
Colin Miller	Extended QDT Member	West Lothian College
Douglas Newell	Extended QDT Member	Kilmarnock College
Jim Spry	Extended QDT Member	City of Glasgow College
David Torsney	Extended QDT Member	West Lothian College

Appendix 2: Mapping of aims to Units

Unit title	Aim 1 To develop the candidate's knowledge and skills such as planning, analysing and synthesizing	Aim 2 To develop employment skills particularly relating to the IT industry	Aim 3 To enable progression within the Scottish Credit and Qualifications Framework	Aim 4 To develop study and research skills	Aim 5 To develop learning and transferable skills including Core Skills	Aim 6 To provide academic stimulus	Aim 7 To support candidates' Continuing Professional Development	Aim 8 Update the contents of the award to reflect current professional practices and technologies	Aim 9 Update the contents of the award to incorporate best practice in assessment	Aim 10 Maximise flexibility	Aim 11 Reduce the level of demand of the award	Aim 12 To support the academic requirements for membership of computing professional bodies	Aim 13 Produce awards that are compatible with a wide range of vendors
Professionalism and Ethics in Computing	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	
Developing Software: Introduction	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
Computer Systems Fundamentals	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
Troubleshooting Computing Problems	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
Team Working in Computing	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Computing: Graded Unit 1 (Exam)			✓	✓		✓		✓				✓	
Client Operating Systems	✓	✓	✓	✓		✓	✓	✓	✓	✓			✓
Cloud Computing	✓	✓	✓			✓	✓	✓	✓	✓			
Computer Forensics Fundamentals	✓	✓	✓	✓		✓	✓	✓	✓	✓			
Computer Hardware: Hardware Installation and Maintenance	✓	✓	✓	✓		✓	✓	✓	✓	✓			
Computer Networking: Fundamentals	✓	✓	✓	✓		✓	✓	✓	✓	✓			
Computer Networking: Practical	✓	✓	✓			✓	✓	✓	✓	✓			
Computer Networks: Building Local Area Networks	✓	✓	✓			✓	✓	✓	✓	✓			✓
Computing: PC Hardware and Operating System Essentials	✓	✓	✓	✓		✓	✓	✓	✓	✓			✓
Computing: PC Hardware and Operating System Support	✓	✓	✓	✓		✓	✓	✓	✓	✓			✓
Configuring a Desktop Operating System	✓	✓	✓			✓	✓	✓	✓	✓			✓

Appendix 3: Core Skills Mapping (Mandatory Units)

Unit title	Core Skill Communication	Core Skill Numeracy	Core Skill ICT	Core Skill Problem Solving	Core Skill Working with Others
Developing Software: Introduction				Critical Thinking Embedded (SCQF level 6)	
Team Working in Computing	*Signposted (SCQF level 6)*		Full Core Skill Embedded (SCQF level 6)		Full Core Skill Embedded (SCQF level 6)
Troubleshooting Computing Problems				Full Core Skill Embedded (SCQF level 6)	
Computer Systems Fundamentals		Full Core Skill Embedded (SCQF level 5)			
Professionalism and Ethics in Computing	*Signposted (SCQF level 6)*				

Appendix 4: Mapping of National Occupational Standards to Units

National Occupational Standards for IT Users v3

National Occupational Standards (NOS) set out what an individual is expected to achieve at work in a given occupation. Developed by employers across the UK, NOS set out measurable skills and knowledge required to perform competently in the workplace.

These standards take effect from 1 January 2009.

These standards ensure the NOS are brought up-to-date given both the rapidly changing IT user environment. They streamline the format and layout of standards.

The key objectives for the new NOS are to:

- underpin all IT user qualifications, reflecting the breadth and depth of current practice, giving clarity for employers, and allowing differentiation between the IT user skill sets appropriate for and gained by different users:
  - reflect the changing and increasing use of IT for creative and collaborative tasks;
  - have a greater focus on skills than on knowledge;
  - provide a simple framework for all IT User qualifications;
  - provide clear articulation with Functional Skills, Skills for Life, Essential Skills, Adult Basic Skills, Key and Core Skills standards;
  - provide clear articulation with IT Professional standards;
  - be expressed in simple and straightforward language, amplified with examples of both content and context; and
  - be easily navigated and uniquely referenced.

IT and Telecoms Professional National Occupational Standards (NOS) have been developed in parallel with and as part of the IT Professional Competency Model — e-skills Procom.

E-skills Procom is being established as the industry recognised, internationally relevant training framework for organising courses and qualifications. It defines knowledge, understanding, and competencies for seven broad disciplines.

The disciplines are;

1 Sales and marketing
2 Business change
3 Programme and project management
4 Solutions architecture
5 Solution development and implementation
6 Information management and security
7 IT service management and delivery

The content of disciplines 1–3, while important to the IT&T sectors, do not fall within the scope of e-skills UK for NOS. Consequently these will not formally be recognised as NOS as is the case for disciplines 4–7. To maintain the relationship these NOS have been numbered to reflect the relationship to e-skills Procom.

Within each discipline there exist a number of sub-disciplines. Within each sub-discipline the competences relating to a particular role have been defined.

This is an example of a structure and as there are many more optional Units available then this is not an exhaustive list. Any list would have to contain the six mandatory Units and another six optional Units to satisfy the award conditions.

	NOS Reference 4 Solutions Architecture							
	4.1	**4.2**	**4.3**	**4.4**	**4.5**	**4.6**	**4.7**	**4.8**
Unit title	Systems Architecture	Data Analysis	Human Needs Analysis	Systems Analysis	Data Design	Human Computer Interaction /Interface (HCI) Design	Systems Design	IT/Technology Infrastructure Design and Planning
Professionalism and Ethics in Computing								
Developing Software: Intro		✓		✓	✓	✓	✓	
Computer Systems Fundamentals	✓					✓		✓
Troubleshooting Computing Problems	✓	✓	✓			✓	✓	✓
Team Working in Computing	✓	✓	✓	✓	✓	✓	✓	✓
Computing: Graded Unit 1 (Exam)								

	NOS Reference 4 Solutions Architecture							
	4.1	**4.2**	**4.3**	**4.4**	**4.5**	**4.6**	**4.7**	**4.8**
Unit title	Systems Architecture	Data Analysis	Human Needs Analysis	Systems Analysis	Data Design	Human Computer Interaction /Interface (HCI) Design	Systems Design	IT/Technology Infrastructure Design and Planning
Client Operating Systems	✓		✓			✓		✓
Cloud Computing	✓	✓	✓	✓	✓	✓	✓	✓
Computer Forensics Fundamentals	✓			✓	✓		✓	✓
Computer Hardware: Hardware Installation and Maintenance	✓		✓	✓		✓	✓	✓
Computer Networking: Fundamentals	✓					✓	✓	✓
Computer Networking: Practical	✓					✓	✓	✓
Computer Networks: Building LANs	✓					✓	✓	✓

	NOS Reference 4 Solutions Architecture							
	4.1	**4.2**	**4.3**	**4.4**	**4.5**	**4.6**	**4.7**	**4.8**
Unit title	Systems Architecture	Data Analysis	Human Needs Analysis	Systems Analysis	Data Design	Human Computer Interaction /Interface (HCI) Design	Systems Design	IT/Technology Infrastructure Design and Planning
Computing: PC Hardware and Operating System Essentials	✓					✓	✓	✓
Computing: PC Hardware and Operating System Support	✓					✓	✓	✓
Configuring a Desktop Operating System	✓					✓	✓	✓

	NOS Reference 5. Solution Development and Implementation				
	5.1	**5.2**	**5.3**	**5.4**	**5.5**
Unit title	Systems Development	Software Development	IT/Technology Solution Testing	Systems Integration	IT/technology systems installation, implementation and handover
Professionalism and Ethics in Computing					
Developing Software: Intro	✓	✓	✓	✓	✓
Computer Systems Fundamentals	✓		✓		✓
Troubleshooting Computing Problems	✓	✓	✓	✓	✓
Team Working in Computing	✓	✓	✓	✓	✓
Computing: Graded Unit 1 (Exam)					

	NOS Reference 5. Solution Development and Implementation				
	5.1	**5.2**	**5.3**	**5.4**	**5.5**
Unit title	Systems Development	Software Development	IT/Technology Solution Testing	Systems Integration	IT/technology systems installation, implementation and handover
Client Operating Systems			✓	✓	✓
Cloud Computing			✓	✓	✓
Computer Forensics Fundamentals					
Computer Hardware: Hardware Installation and Maintenance			✓	✓	✓
Computer Networking: Fundamentals			✓	✓	✓
Computer Networking: Practical			✓	✓	✓

	NOS Reference 5. Solution Development and Implementation				
	5.1	**5.2**	**5.3**	**5.4**	**5.5**
Unit title	Systems Development	Software Development	IT/Technology Solution Testing	Systems Integration	IT/technology systems installation, implementation and handover
Computer Networks: Building LANs			✓	✓	✓
Computing: PC Hardware and Operating System Essentials			✓	✓	✓
Computing: PC Hardware and Operating System Support			✓	✓	✓
Configuring a Desktop Operating System			✓	✓	✓

	NOS Reference 6. Information Management and Security		
	6.1	**6.2**	**6.3**
Unit title	Information Management	IT Security Management	IT Disaster Recovery
Professionalism and Ethics in Computing	✓	✓	
Developing Software: Intro	✓	✓	
Computer Systems Fundamentals			
Troubleshooting Computing Problems	✓	✓	✓
Team Working in Computing	✓	✓	✓
Computing: Graded Unit 1 (Exam)			

	NOS Reference 6. Information Management and Security		
	6.1	**6.2**	**6.3**
Unit title	Information Management	IT Security Management	IT Disaster Recovery
Client Operating Systems	✓	✓	✓
Cloud Computing			
Computer Forensics Fundamentals	✓	✓	
Computer Hardware: Hardware Installation and Maintenance			✓
Computer Networking: Fundamentals			✓
Computer Networking: Practical		✓	✓
Computer Networks: Building LANs		✓	✓

	NOS Reference 6. Information Management and Security		
	6.1	**6.2**	**6.3**
Unit title	Information Management	IT Security Management	IT Disaster Recovery
Computing: PC Hardware and Operating System Essentials			✓
Computing: PC Hardware and Operating System Support			✓
Configuring a Desktop Operating System			✓

Appendix 5: Guidance on Credit Transfer for HNC's and HNDs in Computing

HNC Computing was validated by SQA in June 2012 and HND Computing awards are due for validation in December 2012. These courses will replace a number of older group awards including:

G7GL 15	HNC Computing
G7DX 15	HNC Computer Networking
G7DY 16	HND Computer Networking and Internet Technology
G7TT 16	HND Computing: Software Development
G7TR 16	HND Computing: Technical Support

These group awards have been available since 2004/5 and themselves replaced older group awards, dating back to 2001. This guidance covers **full** credit transfer from units in the 2004/5 group awards to units in the 2012 group awards.

When new group awards are introduced, students often wish to transfer between the old and the new frameworks. For example, they may have started on an HNC under an older framework and wish to complete their HND on the new framework, or they may have completed units some time ago and wish to use these as part of an HNC or HND under the new framework.

To assist in this process, SQA normally provides centres with guidance on Credit Transfer between the old and the new frameworks. SQA have clear criteria for deciding if two syllabuses are equivalent. All the following criteria must be satisfied if full credit transfer is to be recognised between both syllabuses:

1. *The syllabuses have the same SCQF levels.*
2. *The syllabuses have the similar credit values (or equivalent).*
3. *The syllabuses are equivalent in terms of core skill coverage.*
4. *The syllabuses relate to the same subject area and the main topics are common to both.*
5. *The syllabuses present a similar level of cognitive demand.*
6. *The syllabuses encompass similar skill-sets.*
7. *The syllabuses are contemporary in terms of terminology, techniques and technology.*
8. *Employers, admission officers and other users would perceive both syllabuses as broadly equivalent.*
9. *The assessment demands are similar in terms of candidate activity and performance criteria, or candidates would be equally likely to pass both assessments.*
10. *Special conditions (where they exist) are applicable to both syllabuses.*

This document is of an advisory nature. **The final decision on whether or not to grant credit transfer must be made by the centre and is subject to external moderation.** However, external moderators are unlikely to raise objections to any credit transfer based on the advice given here.

Credit transfer table

2004/5 GROUP AWARD UNITS		2012 GROUP AWARD UNITS	
Unit No.	**Unit title**	**Unit No.**	**Unit title**
DF9M 34	Client Operating System	H1EM 34	Client Operating Systems
DH2Y 34	Computer Hardware: Hardware Installation and Maintenance	H1FY 34	Computer Hardware: Hardware Installation and Maintenance
F1XA 34	Computing: PC Hardware and Operating System Essentials	H17E 34	Computing: PC Hardware and Operating Systems Essentials
F1X9 34	Computing: PC Hardware and Operating System Support	H17F 34	Computing: PC Hardware and Operating Systems Support
DH36 34	Computing: Graded Unit 1 (Exam)	H1J8 34	Computing: Graded Unit 1 (Exam)
DH37 34	Information Technology: Information Systems and Services	H1G0 34	IT: Information Systems & Services
DM30 35	Project Management 1	H17D 34	Computing: Introduction to Project Management
DH31 34	Computer Networks: Building Local Area Networks	H17C 34	Computer Networks: Building Local Area Networks
D75V 35	Computer Networks: Network Technology and Data Communications	H16V 35	Network Technology and Data Communications
DH32 35	Software Development: Developing for the World Wide Web	H1J9 35	Software Development: Developing Websites for Multiplatform Use
DH2X 34	Providing Support to Users	H17T 34	Providing Support to Users
DH3D 35/ FE77 35	Software Development Relational Database Systems	H16W 35	Relational Database Management Systems
D76V 35	Software Development Object Oriented Programming	H171 35	Software Development: Object Oriented Programming
DH3F 34	Systems Development: Introduction	H180 34	Systems Development: Introduction

DN4N 35	Computing: Software Development: Graded Unit 2 (Project)	H48W 35	Computing: Software Development: Graded Unit 2 (Project)
DN4P 35	Computing: Technical Support: Graded Unit 2 (Project)	H48X 35	Computing: Technical Support: Graded Unit 2 (Project)
DG0H 35	Computer Networking and Internet Technology: Graded Unit 2 (Project)	H48V 35	HND Computing: Networking Graded Unit 2 (Project)
F0N0 35	Professional Issues in Computing	H1F7 34	Professionalism and Ethics in Computing
DH21 34 D75X 34	Working Within a Project Team **AND** Information Technology: Applications Software 1	H178 34	Team Working in Computing
DH2T 34 DH33 34	Computer Architecture 1 **AND** Computer Operating Systems 1	H175 34	Computer Systems Fundamentals
F6BV 35	Human Computer Interface	H17L 34	Human Computer Interaction
DF9P 34	Network Concepts	H17S 34	Network Concepts
DG02 34	Security Concepts	HT9G 34	Network Security Concepts
DM3H 35	Systems Development: Object Oriented Design	H172 35	Systems Development: Object Oriented Analysis and Design
DG07 34	Mail Server Administration	H17N 34	Mail Server Management
D75V 35	Computer Networks: Network Technology and Data Communications	H17A 34	Computer Networking Fundamentals