



# **Arrangements for: SQA Advanced Certificate in Computing**

**Group Award Code: GM8K 47**

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# Acknowledgement

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of SQA Advanced Qualifications.

## Further information

Call SQA's Customer Contact Centre on 44 (0) 141 500 5030 or 0345 0345 279 1000. Alternatively, complete our Centre Feedback Form.

## History of changes

It is anticipated that changes will take place during the life of the qualification and this section will record these changes. Centres are advised to check SQA Connect 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
12	<b>Addition of Optional Unit:</b> Managing Database Systems Using SQL (J8G9 47) has been added to the framework as an optional unit.	12/09/24
11	<b>Addition of Optional Units:</b> Cryptography: Practical Applications - J550 47, Application Security - J54X 47, Software Security - J553 47, Communicating with Data - J54Y 47 and Working with Data - J554 47 added as Group 1 optional units.	04/12/20
10	<b>Addition of Optional Unit:</b> J54E 47 Agile Development: Introduction added as an Optional unit	16/11/20
09	<b>Addition of Optional Units:</b> Emerging Technologies and Experiences (J1CJ 47), Artificial Intelligence (J1CD 47), Computer Programming (J1CH 47) and Cyber Resilience (J45W 47) added as Optional units.	13/05/20
08	<b>Addition of Optional Unit:</b> HP1L 48 Switching Technology in Group 4 Local Options	21/04/20
07	<b>Addition of Optional Unit:</b> J3CP 47 Data Flow added as an Optional unit	24/03/20
06	<b>Addition of Optional Unit:</b> J1S1 47 Data Security added as an Optional unit.	17/12/19
05	<b>Addition of Unit:</b> J1GK 47 Web Technologies 1: HTML and CSS added to Local Options (Group 4)	09/11/18
04	<b>Addition of Units:</b> HP2L 48 Software Development: Object Oriented Programming and HR9T 47 Big Data added to Local Options (Group 4).	26/10/18
03	<b>Addition of Unit:</b> HP2H 48 Self Describing Data (XML) added to Local Options (Group 4).	28/08/18

## SQA Advanced Certificate

Version number	Description	Date
02	<p>The unit Computer Forensics Fundamentals (HP28 47) has been revised by unit Digital Forensics (J0L3 47).</p> <p>The unit Ethical Hacking Fundamentals (HR90 47) has been revised by unit Ethical Hacking (J0L2 47).</p> <p>Centres should enter candidates for the revised units from 1<sup>st</sup> August 2018. Centres may continue to enter candidates to HP28 47 or HR90 47, but candidates must have completed and results submitted by no later than 31/07/2021.</p>	28/06/18

# SQA Advanced Certificate

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### **1 Introduction**

This is the Arrangements Document for the Group Award in SQA Advanced Certificate in Computing. This document includes background information on the Group Award, its aims, guidance on access, details of the Group Award structure, and guidance on delivery.

## **2 Rationale for the Group Award**

The SQA Advanced Certificate Group Award is designed to equip candidates with the knowledge, understanding and skills required for success in current and future employment or for progression to further academic and/or professional qualifications.

### 3 Aims of the Group Award

#### 3.1 Title of Group Award

The title of the award is SQA Advanced Certificate in 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

#### 3.2 General aims of the Group Award

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 SQA Advanced Certificate (or SQA Advanced Diploma) to degree programmes.

#### 3.4 Relationship of mandatory Units to aims of the SQA Advanced Certificate

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 1.

### 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 the Group 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 SQA Advanced 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.

### 4.1 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 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.

### 4.2 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 SQA Advanced Units or to the required Core Skills which are listed in the next section.

**4.3 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	(SCQF 5)
Information and Communication Technology (ICT)	(SCQF 5)
Numeracy	(SCQF 5)
Working with Others	(SCQF 5)
Problem Solving	(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 SQA Advanced Certificate

In order to achieve the SQA Advanced Certificate in 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 SQA Advanced Certificate in Computing framework leading to four distinct SQA Advanced Diploma 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 SQA Advanced Diploma 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.

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Although hardware and software are continually changing, an understanding of the physical, software and logical elements of a computer is required 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 SQA Advanced Diploma 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 SQA Credits

Candidates must pass all of the following Units.

Unit title	Code	SCQF credit points	SCQF level	SQA credit value
Computer Systems Fundamentals	HP1T 47	8	7	1
Developing Software: Introduction	HP1R 47	8	7	1
Professionalism and Ethics in Computing	HP29 47	8	7	1
Team Working in Computing	HP1X 47	8	7	1
Troubleshooting Computing Problems	HP1V 47	8	7	1
SQA Advanced Certificate in Computing: Graded Unit 1 (Exam)	HR9J 47	8	7	1

### Optional Units — Total of 6 SQA 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)

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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
Using Software Applications Packages	HR0A 47	8	7	1
Information Technology: Applications Software 1	HP6L 47	8	7	1
Computing: Planning	HR74 47	8	7	1
Big Data	HR9T 47	8	7	1
Data Science	HR9V 48	16	8	2
Private Cloud Virtualisation	HR9R 48	8	8	1
Building an e-Business	HR7V 47	8	7	1
Client Operating Systems	HP27 47	16	7	2
Cloud Computing	HP1Y 47	8	7	1
Digital Forensics	J0L3 47*	8	7	1
Computer Hardware: Hardware Installation & Maintenance	HR91 47	16	7	2
Computer Networking: Fundamentals	HR87 47	8	7	1
Computer Networking: Practical	HP20 47	8	7	1
Computer Networks: Building Local Area Networks	HP2Y 47	16	7	2
Computing: Introduction to Project Management	HP21 47	8	7	1
Computing: PC Hardware and Operating System Essentials	HP24 47	8	7	1
Computing: PC Hardware and Operating System Support	HR88 47	8	7	1
Configuring a Desktop Operating System	HR85 47	16	7	2
Convergence Technologies	HP25 48	16	8	2
Database Design Fundamentals	HP2G 47	8	7	1
Databases: Introduction	HR89 47	8	7	1
Developing Mobile Web Based Applications: An Introduction	HR9X 47	16	7	2
Digital Culture: Online Collaboration	HR83 48	8	8	1
Digital Culture: Online Communications	HR81 47	8	7	1
Digital Culture: Web 2.0 Applications	HR82 46	8	6	1
E-Commerce: Publishing Web Sites	HR1V 47	16	7	2
Entrepreneurship in the Creative Industries	HR7G 48	8	8	1
Ethical Hacking	J0L2 47*	8	7	1
Preparing to Start a Business	HR3E 47	8	7	1

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Unit title	Code	SCQF credit points	SCQF level	SQA credit value
Data Security	J1S1 47*	8	7	1
Handling Information as a Resource	HR8A 47	8	7	1
Human Computer Interaction	HR8C 47	8	7	1
Intrusion Prevention Systems	HR8D 47	8	7	1
Information Technology: Information Systems and Services	HR92 47	8	7	1
Mail Server Management	HP30 47	8	7	1
Managing a Web Server	HR8E 47	8	7	1
Mobile Technology	HR8F 48	8	8	1
Multi User Operating Systems	HR77 47	8	7	1
Multimedia: Developing Multimedia Applications	HR72 47	16	7	2
Network Concepts	HR8G 47	16	7	2
Personal Development Planning	HP6M 47	8	7	1
Project Management for IT	HR7J 47	8	7	1
Providing Support to Users	HR8H 47	8	7	1
Relational Database Management Systems	HP2J 48	16	8	2
Network Security Concepts	HX00 47	16	7	2
Software Development: Developing Small Standalone Applications	HP2N 47	16	7	2
Software Development: Programming Foundations	HP2P 47	8	7	1
Professional Career Development in the IT Industry	HT06 47	8	7	1
Website Design, Planning & Design,	HR8N 47	8	7	1
Website Design, Multimedia Content Creation	HR8R 47	8	7	1
Website Design, Development Technologies	HR8V 47	8	7	1
Emerging Technologies and Experiences	J1CJ 47*	8	7	1
Artificial Intelligence	J1CD 47*	8	7	1
Computer Programming	J1CH 47*	8	7	1
Cyber Resilience	J45W 47*	8	7	1

**\*Refer to History of Changes for information.**

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Unit title	Code	SCQF credit points	SCQF level	SQA credit value
Software Development: Systems Foundations	HR8K 47	16	7	2
SQL: Introduction	HP2E 47	8	7	1
Manage Database Systems Using SQL	J8G9 47*	8	7	1
Systems Development: Introduction	HR8M 47	8	7	1
Systems Development: Testing Software	HR8P 47	8	7	1
Systems Development: User Centred Design	HR8T 47	8	7	1
Technical Support: Supporting Users – Hardware	HP31 47	8	7	1
Technical Support: Supporting Users - Software	HP32 47	8	7	1
Troubleshooting a Desktop Operating System	HR86 47	16	7	2
User Interface Design	HR9Y 47	8	7	1
Web Development: Essential Content	HT05 47	16	7	2
Work Role Effectiveness	HR0M 47	24	7	3
Work Role Effectiveness	HR0P 48	24	8	3
Working in IT	HR8X 48	16	8	2
Workplace Communication in English	HR1C 46	8	6	1
Digital Skills	HR9W 47	8	7	1
Software Development: Event Driven Programming	HR8L 48	16	8	2
Machines, Languages & Computation	HT08 47	16	7	2
Computer Systems and Organisation	HT07 48	8	8	1
Data Flow	J3CP 47*	8	7	1
Agile Development: Introduction	J54E 47*	8	7	1
Cryptography: Practical Applications	J550 47*	8	7	1
Application Security	J54X 47*	8	7	1
Software Security	J553 47*	8	7	1
Communicating with Data	J54Y 47*	8	7	1
Working with Data	J554 47*	8	7	1
<b>Group 2 — ‘Mathematics’ Options (Maximum of 2 SQA Credits)</b>				
Mathematics for Computing 1	HP1H 47	8	7	1
Mathematics for Computing 2	HR6T 48	8	8	1
Mathematics for Interactive Computing: Essential Techniques	HR7R 47	8	7	1
Mathematics: Calculus and Matrices for Computing	HR7E 47	8	7	1
Routing Technology	HP1J 48	16	8	2
Networking Technology	HP1M 48	16	8	2

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Unit title	Code	SCQF credit points	SCQF level	SQA credit value
Bring Your Own Device (BYOD): Introduction	HR9P 47	8	7	1
Engineering Mathematics 4	HT03 48	8	8	1
Statistics for Science 1	HR8L 48	8	6	1
<b>Group 3 — ‘Vendor’ Options (Maximum of 3 SQA Credits)</b>				
Technical Specialist: Windows Server 2008: Network Infrastructure, Configuring	If selecting these vendor options please contact SQA Computing Team for further guidance (ict@sqa.org .uk)	30	7	3.5
Technical Specialist: Windows Server 2008: Applications Infrastructure, Configuring		24	7	3
Technical Specialist: Deploying and Maintaining Windows Vista Client and Microsoft 2007 Office Desktops		15	7	1.5
Technical Specialist: Configuring Microsoft Windows Vista Client	If selecting these vendor options please contact SQA Computing Team for further guidance (ict@sqa.org .uk)	15	7	1.5
Technical Specialist: Windows 7: Configuring		24	8	3
Technical Specialist: Windows Server 2008: Active Directory Configuring		35	8	4
IT Professional: Windows Server 2008: Server Administrator		15	9	1.5
IT Professional: Windows Server 2008: Enterprise Administrator		40	9	5
Technical Specialist: Web Applications Development with Microsoft .NET Framework 4		30	8	3.5
Technical Specialist: Windows Communication Foundation Development with Microsoft .NET Framework 4		9	9	1
Technical Specialist: Windows Applications Development with Microsoft .NET Framework 4		15	9	1.5
Technical Specialist: Accessing Data with Microsoft .NET Framework 4		15	8	1.5
Technical Specialist: Microsoft SharePoint 2010, Application Development		15	9	1.5
Database Design and Programming in SQL		15	8	1.5
Database Programming with PL/SQL		15	9	1.5
<b>Group 4 — Options (up to 2 SQA Credits)</b>				
Web Development Fundamentals	HR7M 47	8	7	1

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Unit title	Code	SCQF credit points	SCQF level	SQA credit value
Web Development: Essential Content	HT05 47	16	7	2
Compositing and Motion Graphics	J12G 47*	8	7	1
Big Data	HR9T 47*	8	7	1
Self Describing Data (XML)	HP2H 48*	8	8	1
Software Development: Object Oriented Programming	HP2L 48*	16	8	2
Web Technologies 1: HTML and CSS	J1GK 47*	8	7	1
Switching Technology	HP1L 48	16	8	2

\*Refer to History of Changes for information.

### 5.3 Vendor qualifications

SQA has agreed to participate in a project to evaluate the feasibility of directly accrediting vendor qualifications within this award. This project 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.

Now vendors have the responsibility for recognition. 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. Figure 1 illustrates the process of vendor accreditation.

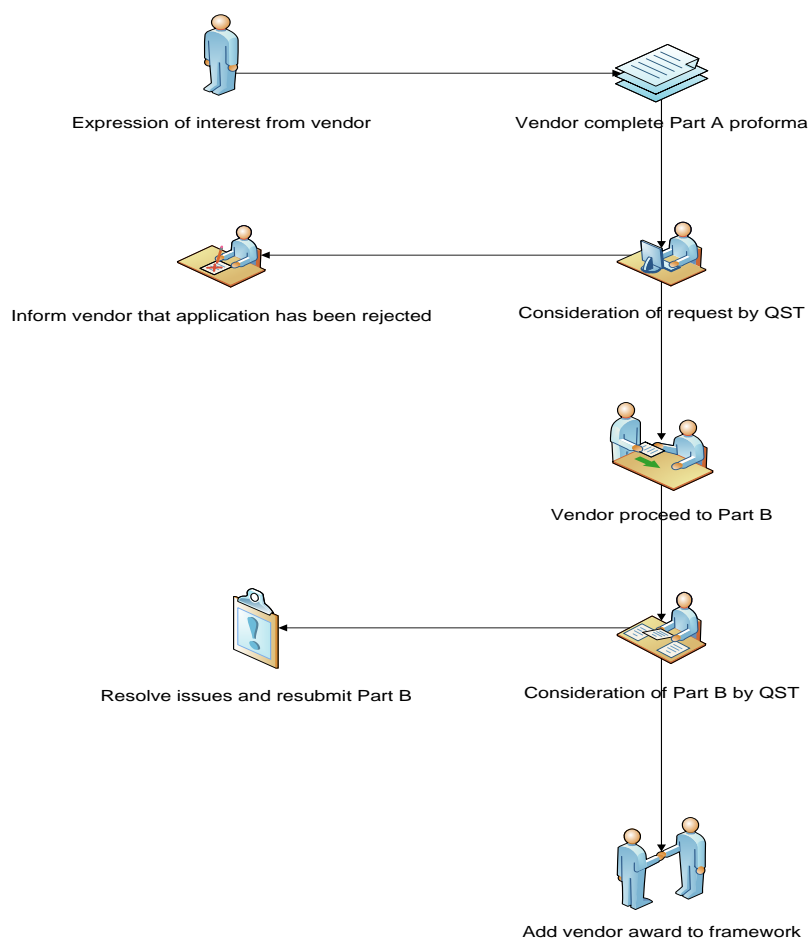


Figure 1: Vendor accreditation process

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The Qualifications Committee imposed a cap on the contribution of vendor awards to National Qualifications. The cap is 25% (three credits for an SQA Advanced Certificate). This limit applies to all vocational qualifications with direct recognition of third party awards, based on SCQF.

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 SQA Advanced Certificate 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) SQA Advanced Unit, these Units (the vendor Unit and the SQA Advanced 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 SQA Advanced awards.

### **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 SQA Advanced Diploma**

Progression from the SQA Advanced Certificate to any of the aforementioned SQA Advanced Diplomas can be gained by achieving the SQA Advanced Certificate award. The SQA Advanced Certificate is achievable with 12 credits; however, it is recommended that candidates wishing to progress to the SQA Advanced Diploma should achieve 15 Units while studying for the SQA Advanced Certificate. 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 SQA Advanced Certificate 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 SQA Advanced Certificate award and supported the qualification. 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 SQA Advanced Diploma qualifications:

- 1 SQA Advanced Diploma in Computer Science
- 2 SQA Advanced Diploma in Computing: Software Development
- 3 SQA Advanced Diploma in Computing: Technical Support
- 4 SQA Advanced Diploma in Computing: Networking

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

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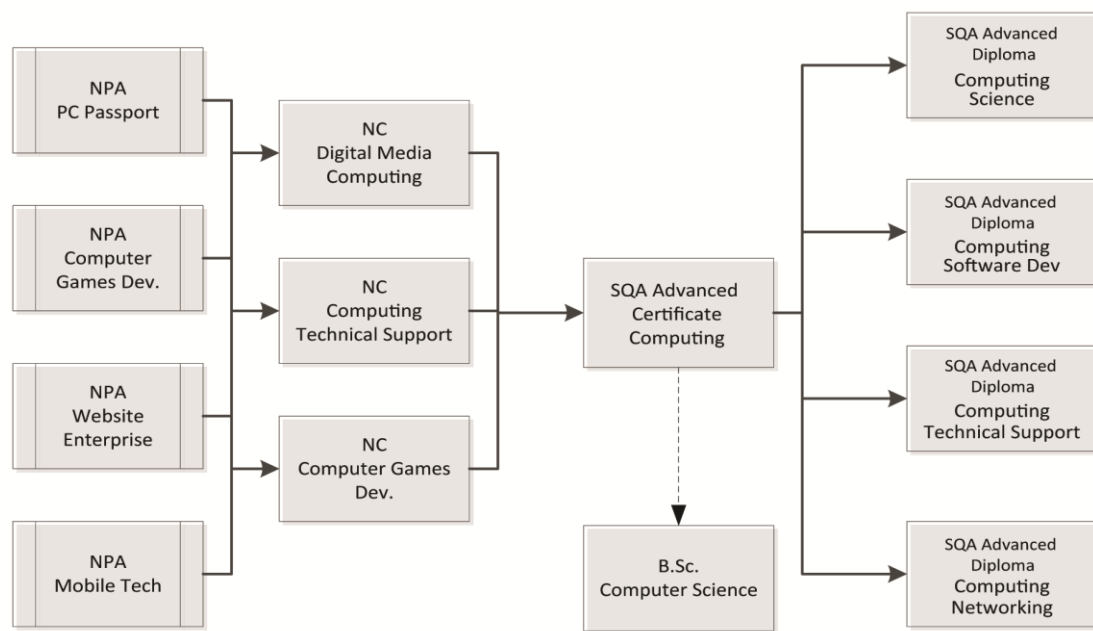


Figure 2: Articulation and progression

## 6 Approaches to delivery and assessment

### 6.1 Content and context

The contents of the SQA Advanced Certificate reflect contemporary technologies and methodologies, including:

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

The SQA Advanced Certificate in Computing 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. Assessment in an SQA Advanced Certificate 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.

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### 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 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 SQA Advanced Certificate to SQA Advanced Diploma awards

The following tables are the suggested pathways from SQA Advanced Certificate in Computing to each of the proposed SQA Advanced Diploma in Computing awards.

<b>SQA Advanced Certificate in Computing ⇒ SQA Advanced Diploma in Computer Science</b>	<b>SCQF Level</b>	<b>SQA Credit(s)</b>
<i>All Mandatory SQA Advanced Certificate in Computing Units (6 SQA Credits) plus</i>		
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

<b>SQA Advanced Certificate in Computing ⇒ SQA Advanced Diploma in Computing: Technical Support</b>	<b>SCQF Level</b>	<b>SQA Credit(s)</b>
<i>All Mandatory SQA Advanced Certificate in Computing Units (6 SQA Credits) plus 9 SQA Credits from the Units listed below</i>		
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

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SQA Advanced Certificate in Computing ⇒ SQA Advanced Diploma in Computing: Software Development	SCQF Level	SQA Credit(s)
<i>All Mandatory SQA Advanced Certificate in Computing Units (6 SQA Credits) plus</i>		
Software Development: Developing Small Stand Alone Applications	7	2
<i>Plus 7 SQA Credits from the Units listed below</i>		
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

SQA Advanced Certificate in Computing ⇒ SQA Advanced Diploma in Computing: Networking	SCQF Level	SQA Credit(s)
<i>All Mandatory SQA Advanced Certificate in Computing Units (6 SQA Credits) plus</i>		
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:** SQA Advanced Certificate in 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.

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The Graded Unit for this award is designed to provide evidence that the candidate has achieved the following principal aims of the SQA Advanced in 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	(SCQF 5)	(SCQF 6)
Information and Communication Technology (ICT)	(SCQF 5)	(SCQF 6)
Numeracy	(SCQF 5)	(SCQF 5)
Working with Others	(SCQF 5)	(SCQF 6)
Problem Solving	(SCQF 5)	(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 SQA Advanced Certificate in 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.

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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

### Equality and inclusion

The Unit specifications making up this Group Award have been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners will 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)**.

### 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](http://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 SQA Advanced Certificate 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 SQA Advanced Certificate 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 SQA Advanced Certificate in 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 SQA Advanced Certificate in 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:

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- 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 SQA Advanced Certificate student may be given articulated access.

Examples of degree programmes where it should be possible for a candidate with SQA Advanced Certificate in 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 SQA Advanced Diploma 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 SQA Advanced Certificate 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 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](http://www.scqf.org.uk)

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

**SCQF levels:** The SCQF covers 12 levels of learning. SQA Advanced 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 outside of automatic certification.

**Qualification Design Team:** The QDT works in conjunction with a Qualification Manager/Development Manager to steer the development of the SQA Advanced Certificate/SQA Advanced Diploma 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.

## **10 Appendices**

Appendix 1: Mapping of aims to Units

Appendix 2: National Occupational Standards (NOS) Mapping

Appendix 3: Core Skills Mapping

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### Appendix 1: Mapping of aims to Units

Unit title	Aim 1	Aim 2	Aim 3	Aim 4	Aim 5	Aim 6	Aim 7	Aim 8	Aim 9	Aim 10	Aim 11	Aim 12	Aim 13
	To develop the candidate's knowledge and skills such as planning, analysing and synthesizing	To develop employment skills particularly relating to the IT industry	To enable progression within the Scottish Credit and Qualifications Framework	To develop study and research skills	To develop learning and transferable skills including Core Skills	To provide academic stimulus	To support candidates' Continuing Professional Development	Update the contents of the award to reflect current professional practices and technologies	Update the contents of the award to incorporate best practice in assessment	Maximise flexibility	Reduce the level of demand of the award	To support the academic requirements for membership of computing professional bodies	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 2: 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	<i>Signposted (SCQF level 6)</i>		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	<i>Signposted (SCQF level 6)</i>				

## **Appendix 3: 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 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 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

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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	✓					✓	✓	✓

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	<b>NOS Reference 4 Solutions Architecture</b>							
	<b>4.1</b>	<b>4.2</b>	<b>4.3</b>	<b>4.4</b>	<b>4.5</b>	<b>4.6</b>	<b>4.7</b>	<b>4.8</b>
<b>Unit title</b>	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	✓					✓	✓	✓

	<b>NOS Reference 5. Solution Development and Implementation</b>				
	<b>5.1</b>	<b>5.2</b>	<b>5.3</b>	<b>5.4</b>	<b>5.5</b>
<b>Unit title</b>	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)					

	<b>NOS Reference 5. Solution Development and Implementation</b>				
	<b>5.1</b>	<b>5.2</b>	<b>5.3</b>	<b>5.4</b>	<b>5.5</b>
<b>Unit title</b>	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			✓	✓	✓

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	<b>NOS Reference 5. Solution Development and Implementation</b>				
	<b>5.1</b>	<b>5.2</b>	<b>5.3</b>	<b>5.4</b>	<b>5.5</b>
<b>Unit title</b>	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			✓	✓	✓

	<b>NOS Reference 6. Information Management and Security</b>		
	<b>6.1</b>	<b>6.2</b>	<b>6.3</b>
<b>Unit title</b>	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)			

	<b>NOS Reference 6. Information Management and Security</b>		
	<b>6.1</b>	<b>6.2</b>	<b>6.3</b>
<b>Unit title</b>	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		✓	✓

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	<b>NOS Reference 6. Information Management and Security</b>		
	<b>6.1</b>	<b>6.2</b>	<b>6.3</b>
<b>Unit title</b>	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			✓