



# **Group Award Specification for:**

**SQA Advanced Diploma in Computer Science**

**Group Award Code: GM91 48**

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

# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
1.1	Rationale	1
1.2	Target Client Groups	1
1.3	Employment Opportunities	1
1.4	Relationship with other awards	2
<b>2</b>	<b>Qualification structure</b>	<b>3</b>
2.1	Structure	3
2.2	Inclusion of vendor qualifications within SQA Advanced Diploma in Computer Science	12
<b>3</b>	<b>Aims of the qualification</b>	<b>14</b>
3.1	General aims of the qualification	14
3.2	Specific aims of the qualification	14
3.3	Graded Unit	14
<b>4</b>	<b>Recommended entry to the qualification</b>	<b>16</b>
4.1	Core Skills entry and exit profile	17
<b>5</b>	<b>Additional benefits of the qualification in meeting employer needs</b>	<b>19</b>
5.1	Mapping of qualification aims to Units	20
5.2	Mapping of National Occupational Standards (NOS) and/or trade body standards	22
5.3	Mapping of Core Skills development opportunities across the qualification	24
5.4	Assessment Strategy for the qualification	25
<b>6</b>	<b>Guidance on approaches to delivery and assessment</b>	<b>28</b>
6.1	Sequencing/integration of Units	29
6.2	Recognition of Prior Learning	32
6.3	Opportunities for e-assessment	33
6.4	Support materials	33
6.5	Resource requirements	33
<b>7</b>	<b>General information for centres</b>	<b>35</b>
<b>8</b>	<b>Glossary of terms</b>	<b>36</b>
<b>9</b>	<b>General information for learners</b>	<b>39</b>

# 1 Introduction

This is the Arrangements Document for the SQA Advanced Diploma in Computer Science. This document includes background information on the group award, its aims, details of the group award structure, and guidance on delivery.

## 1.1 Rationale

The SQA Advanced Diploma in Computer Science 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.

## 1.2 Target Client Groups

The primary target groups for the SQA Advanced Diploma in Computer Science are:

- ◆ Further education students who have completed their National Certificate in Digital Media Computing at SCQF level 5 or level 6 or a combination of both. It is suggested that learners will gain entry onto the award with NC Digital Media Computing at SCQF level 5.
- ◆ Higher education learners completing the SQA Advanced Certificate in Computing with a view to progressing onto the second year of a national award to gain entry into university or seek 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 either within the computing sector or those who wish to change careers totally.
- ◆ Adults wishing to gain a recognised national qualification as part of CPD requirements for their employer.

Specific entry requirements are given in Section 4 of the document.

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 graduates.

This SQA Advanced Diploma allows colleges to maintain an up to date recognised qualification within the context of an ever changing and volatile employment market. Although the core context of the award will remain constant, the number of differing optional Units allows the centre to respond to paradigm shifts from IT to software development to technical support — where local demand requires it. Incorporation of Units such as cloud computing, convergence technologies, network technology and data communications and the inclusion of vendor qualifications all support this statement.

## 1.3 Employment Opportunities

The technical skills most often sought by employers (in order of demand volume) include: SQL, NET, Java, C#, SQL Server, Oracle, ASP, JavaScript, Unix and Linux.

Specific technologies with important skills implications have been also identified and these include: Cloud Computing; Green IT; Social and Mobile Computing; 'Big data'/Analytics, Smart Computing and Security and Data Protection.

Software development, database management and technical support/networking themes can all be traced through this programme. The versatility in the range of optional Units allows the centre to customise the qualification to local needs — whilst the core Units maintain the intended Core Skills of the award.

## 1.4 Relationship with other awards

This award is part of a suite of SQA Advanced Diplomas awards. The relationship between the awards is illustrated in the diagram below.



The SQA Advanced Certificate in Computing is embedded within all of the SQA Advanced Diplomas in Computing, and (largely) constitutes the first year of each programme. Each of these SQA Advanced Diplomas offer a particular specialism that reflects recognised vocational or academic progression paths (see Section 6.2 for further information on vocational or academic progression). The awards have similar structures and equivalent demands (in terms of practical or cognitive competencies) but each seeks to provide different skills sets and underpinning knowledge.

## 2 Qualification structure

This Group Award is made up of 30 SQA Unit credits. It comprises of 240 SCQF credit points of which 64 are at SCQF level 8 in the mandatory section including a SQA Advanced Certificate in Computing Graded Unit 1 of 8 SCQF credit points at SCQF level 7 and a SQA Advanced Diploma in Computer Science Graded Unit 2 of 16 SCQF credit points at SCQF level 8. A mapping of Core Skills development opportunities is available in Section 5.3.

### 2.1 Structure

In order to achieve the SQA Advanced Diploma in Computer Science, the candidate must achieve 14 mandatory credits and 16 optional credits from Groups 1, 2 and 3.

Please note if choosing Units from Group 2 only a maximum of 9 credits can be taken. If choosing from Group 3 only a maximum of 7 credits can be taken.

The mandatory section of this Group Award incorporates 64 SCQF credit points at SCQF level 8, which satisfies the design principles.

#### **Mandatory Units** — Total of 14 credits

Candidates must pass all of the following Units.

Unit title	Code	SCQF credit points	SCQF level	SQA credit value
Developing Software: Introduction	HP1R 47	8	7	1
Professionalism and Ethics in Computing	HP29 47	8	7	1
Computer Systems Fundamentals	HP1T 47	8	7	1
Troubleshooting Computer Problems	HP1V 47	8	7	1
Team Working in Computing	HP1X 47	8	7	1
Computing: Graded Unit 1 (Exam)	HR9J 47	8	7	1
Relational Database Management Systems	HP2J 48	16	8	2
Software Development: Developing Websites for Multiplatform Use	HR9L 48	16	8	2
Managing a Web Server	HP2V 48	16	8	2
Computer Science: Graded Unit 2 (Project)	HR9M 48	16	8	2

It is envisaged that all mandatory SCQF level 7 Units will be taught within the pre-requisite SQA Advanced Certificate in Computing/SQA Advanced Diploma in Computer Science (Year 1).

#### **Optional Units** — Total of 16 credits

Learners must select at least 16 credits selected from one or more of the following groups of optional Units.

- Group 1: Specialist options (up to 16 credits)
- Group 2: General options (up to 9 credits)
- Group 3: Vendor Units (up to 7 credits)

These rules of combination ensure that the aims and objectives of the award are achieved, irrespective of the route through the award. For example, by limiting the general options to 9

credits, all candidates are required to complete at least 21 credits directly related to the subject area.

Group 1 specialist options should be seen as the non-mandatory credits which are fundamental to giving the Group Award its distinctive emphasis on software development. Group 2 general options give centres a degree of flexibility in course design, eg options to include mathematics, networking and hardware. Group 3 Units are dedicated vendor qualifications. See the following section for further information on vendor provision.

Note that a local option is included in Group 4 (general options). Up to four credits can be selected from any area, subject to the design rules and rules of combination defined above. This is consistent with the current awards and reflects the preferences of centres so that they can customise the awards to their local circumstances.

Unit title	Code	SCQF credit points	SCQF level	SQA credit value
<b>Group 1 — Specialist Options (Up to 16 credits)</b>				
Big Data	HR9T 47	8	7	1
Data Science	HR9V 48	16	8	2
Private Cloud Virtualisation	HR9R 48	8	8	1
Cloud Computing	HP1Y 47	7	8	1
SQL Introduction	HP2E 47	8	7	1
Database Design Fundamentals	HP2G 47	8	7	1
E-Commerce: Publishing Web Sites	HR1V 47	16	7	2
Developing Mobile Web Based Applications: An Introduction	HR9X 47	16	7	2
Managing a Web Server	HR8E 47	8	7	1
Software Development: Applications Development	HR6X 47	16	7	2
Software Development: Developing Small Scale Standalone Applications	HP2N 47	16	7	2
Software Development: Object Oriented Programming	HP2L 48	16	8	2
Software Development: Programming Foundations	HP2P 47	8	7	1
Human Computer Interaction	HR8C 47	8	7	1
Mobile Technology	HR8F 48	8	8	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
Client Operating Systems	HP27 47	16	7	2
Computing: Introduction to Project Management	HP21 47	8	7	1
Systems Development: Testing Software	HR8P 47	8	7	1
Systems Development: User Centred Design	HR8T 47	8	7	1
User Interface Design	HR9Y 47	8	7	1
Software Development: Object Oriented Analysis and Design	HP2M 48	16	8	2
Computer Networking: Fundamentals	HR87 47	8	7	1
Computer Networking: Practical	HP20 47	8	7	1

Mathematics for Computing 1	HP1H 47	8	7	1
Systems Development: Introduction	HR8M 47	8	7	1
Software Development: Data Structures	HP2K 48	16	8	2
Open Source Operating Systems: Introduction to Command Line Administration	HP33 48	16	8	2
Artificial Intelligence	J1CD 47	8	7	1
Computer Architecture	J1CE 47	8	7	1
Computer Operating Systems	J1CF 47	8	7	1
Computer Operating Systems	J1CG 48	16	8	2
Computer Programming	J1CH 47	8	7	1
Emerging Technologies & Experiences	J1CJ 47	8	7	1
Firewall Essentials	J3CN 47*	16	7	2
Internet of Things	J1CM 47	8	7	1
Machine Learning	J1CN 47	8	7	1
Machine Learning	J1CP 48	16	8	2
Robotics: Fundamentals	J1CR 47	8	7	1
Data Security	J1S1 47*	8	7	1
Data Flow	J3CP 47*	8	7	1
Agile Development: Introduction	J54E 47*	8	7	1
Cryptography: Practical Applications	J550 47*	8	7	1
Programming for Data	J552 48*	8	8	1
Machine Learning	J551 49*	16	9	2
Website Design: Multimedia Content Creation	HR8R 47*	8	7	2

Unit title	Code	SCQF credit points	SCQF level	SQA credit value
<b>Group 2 — General Options (Up to 9 credits)</b>				
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
Configuring a Desktop Operating System	HR85 47	16	7	2
Managing a Desktop Operating System Deployment	HR84 48	16	8	2
Network Technology and Data Communications	HP2X 48	16	8	2
Artificial Intelligence for Computer Games	HT00 48	16	8	2
Entrepreneurship in the Creative Industries	HR7G 48	8	8	1
Technical Support: Supporting Users – Hardware	HP31 47	8	7	1
Technical Support: Supporting Users - Software	HP32 47	8	7	1
Building an e-Business	HR7V 47	8	7	1
Computer Networks: Building Local Area Networks	HP2Y 47	16	7	2
Multi User Operating Systems	HR77 47	8	7	1
Troubleshooting a Desktop Operating System	HR86 47	16	7	2

Digital Forensics	J0L3 47*	8	7	1
Databases: Introduction	HR89 47	8	7	1
Convergence Technologies	HP25 48	16	8	2
Digital Culture: Online Collaboration	HR83 48	8	8	1
Digital Culture: Online Communications	HR81 47	8	7	1
Software Development: Systems Foundations	HR8K 47	16	7	2
Digital Forensics	J0L3 47*	8	7	1
Computer Hardware: Hardware Installation and Maintenance	HR91 47	16	7	2
Digital Culture: Web 2.0 Applications	HR82 46	8	6	1
Ethical Hacking	J0L2 47	8	7	1
Preparing to Start a Business	HR3E 47	8	7	1
Handling Information as a Resource	HR8A 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
Mathematics for Computing 2	HR6T 48	8	8	1
Mathematics for Interactive Computing: Essential Techniques	HR7R 47	8	8	1
Mathematics: Calculus and Matrices for Computing	HR7E 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
Network Security Concepts	HX00 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
Bring Your Own Device (BYOD): Introduction	HR9P 47	8	7	1
Digital Skills	HR9W 47	8	7	1
Statistics for Science 1	HT04 46*	8	6	1
<b>Group 3 — ‘Vendor’ Options (Up to 7 credits)</b>				
Technical Specialist: Web Applications Development with Microsoft.NET Framework 4	HR93 48	30	8	3.5
Technical Specialist: Windows Communication Foundation Development with Microsoft.NET Framework 4	HR98 49	9	9	1
Technical Specialist: Windows Applications Development with Microsoft.NET Framework 4	HR99 49	15	9	1.5
Technical Specialist: Accessing Data with Microsoft.NET Framework 4	HR9F 48	15	8	1.5
Technical Specialist: Microsoft SharePoint 2010, Application Development	HR9H 49	15	9	1.5
Database Design and Programming in SQL	HR9N 47	15	7	1.5



Database Programming with PL/SQL	HT8Y 48	15	8	1.5
<b>Group 4 — Local Option (Up to 4 credits permitted)</b>				
Web Development Fundamentals	HR7M 47	8	7	1
Routing Technology	HP1J 48	16	8	2
Networking Technology	HP1M 48	16	8	2
Computer Operating Systems 2	HR79 48	8	8	1
Web Development: Dynamically Generated Content	HP2T 48	16	8	2
Professional Career Development in the IT Industry	HT06 47	8	7	1
Big Data	HR9T 47	8	7	1
Self Describing Data (XML)	HP2H 48*	8	8	1
Web Development: Essential Content	HT05 47*	16	7	2

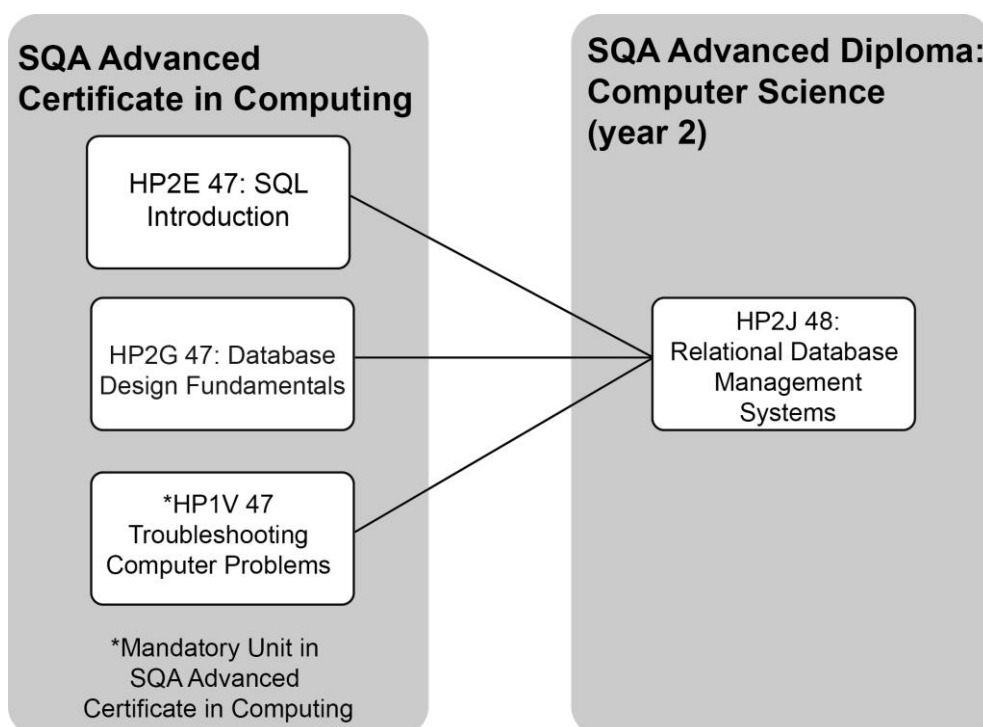
\*Refer to History of Changes for information

**Mapping of Units from SQA Advanced Certificate in Computing/SQA Advanced Diploma in Computer Science, Year 1 which provide underpinning knowledge and skills for each core Unit within second year SQA Advanced Diploma in Computer Science**

Core Unit — HP2J 48: *Relational Database Management Systems*

**Knowledge Outcomes**

- ◆ Identify and use the processes and terminology used in designing a RDBMS.
- ◆ Design a RDBMS from a given scenario.
- ◆ Map the design model to the physical model.
- ◆ Create and run SQL statements/queries on a RDBMS.



### **HP2E 47 SQL: Introduction**

#### **Specific knowledge Outcomes related to core module**

- ◆ Create and maintain a data storage system.
- ◆ Manipulate data stored within a table structure.

### **HP2G 47 Database Design Fundamentals**

#### **Specific knowledge Outcomes related to core module**

- ◆ Create a normalised relational database structure.
- ◆ Write SQL select statements to maintain and update a database structure.
- ◆ To interrogate the database and manipulate the data.

### **HP1V 47 Troubleshooting Computing Problems**

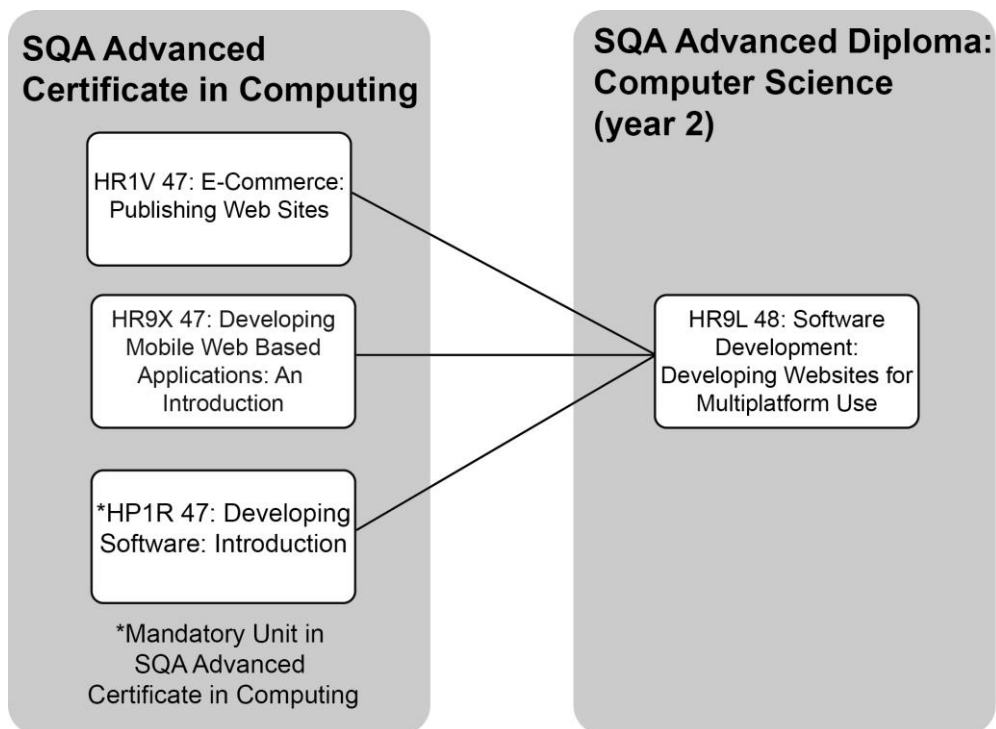
#### **Specific knowledge Outcomes related to core module**

- ◆ Investigate a computing problem.
- ◆ Plan and implement a solution to a computing problem.
- ◆ Document the steps taken to resolve a computing problem.

### **Core Unit — HR9L 48: Software Development: Developing Websites for Multiplatform Use**

#### **Knowledge Outcomes**

- ◆ Describe the scripting features used in the development of websites.
- ◆ Design a website for a specific device using the principles of software planning and design.
- ◆ Use appropriate tools and techniques to optimise websites developed for a specific device.
- ◆ Utilise server-side scripting including database processing of requests submitted from a specific device.



### **HR1V 47 e-commerce: Publishing Websites**

#### **Specific knowledge Outcomes related to core module**

- ◆ Create a database structure for an e-commerce website.
- ◆ Design and implement a user interface for an e-commerce website.
- ◆ Utilise a server-side scripting language to provide site security, database interrogation and user feedback.

### **HR9X 47 Developing Mobile Web Based Applications: An Introduction**

#### **Specific knowledge Outcomes related to core module**

- ◆ Describe the features of the target device and industry structure that can affect the production of mobile web based applications.
- ◆ Design a solution for a mobile web based application.
- ◆ Develop a solution for a mobile web based application.

### **HP1R 47 Developing Software: Introduction**

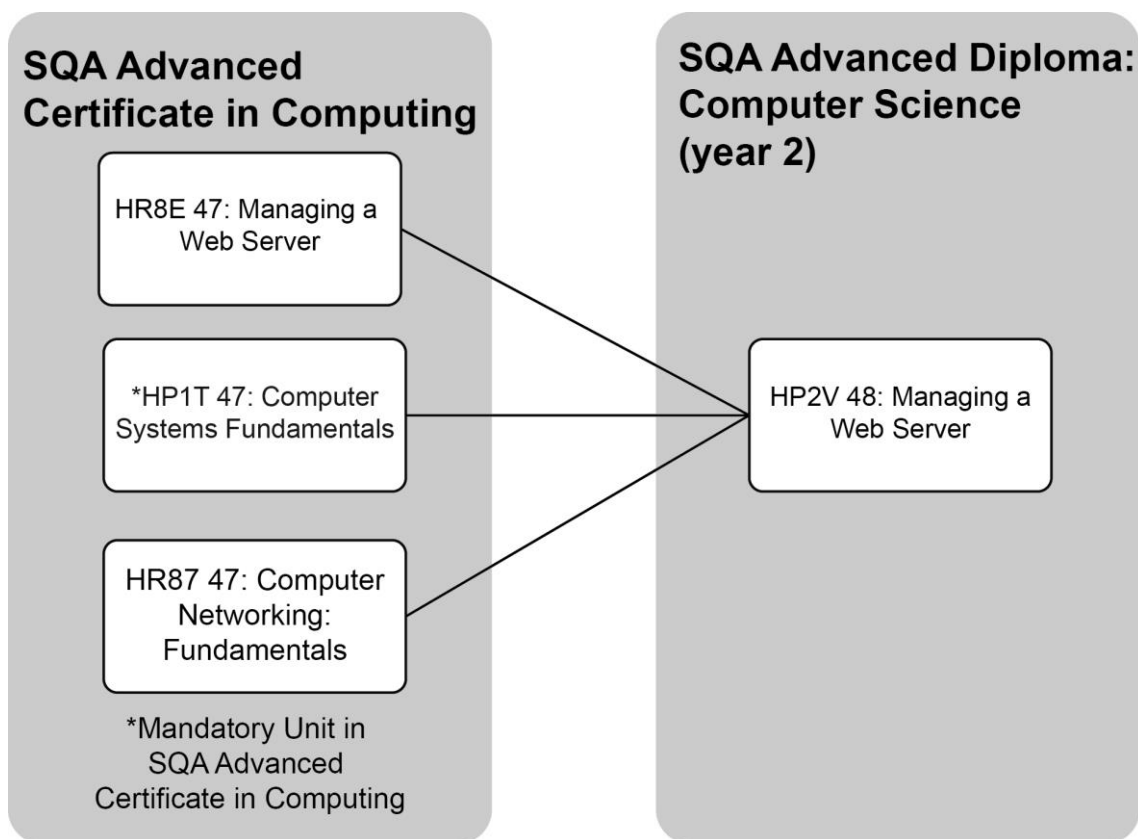
#### **Specific knowledge Outcomes related to core module**

- ◆ Implement and test code to carry out tasks following a given design.
- ◆ Prepare technical documentation in line with good practice.

### **HP2V 48 Managing a Web Server**

#### **Knowledge Outcomes**

- ◆ Analyse and evaluate the requirements for running a web server.
- ◆ Install and configure a web server.
- ◆ Perform web server maintenance.
- ◆ Implement web server security.



### **HR8E 47 Managing a Web Server**

#### **Specific knowledge Outcomes related to core module**

- ◆ Analyse the requirements for setting up and maintaining a new Web Site.
- ◆ Install and set up a web server for the new Web Site.

### **HP1T 47 Computer Systems Fundamentals**

#### **Specific knowledge Outcomes related to core module**

- ◆ Install a range of computer software.

### **HR87 47 Computer Networking: Fundamentals**

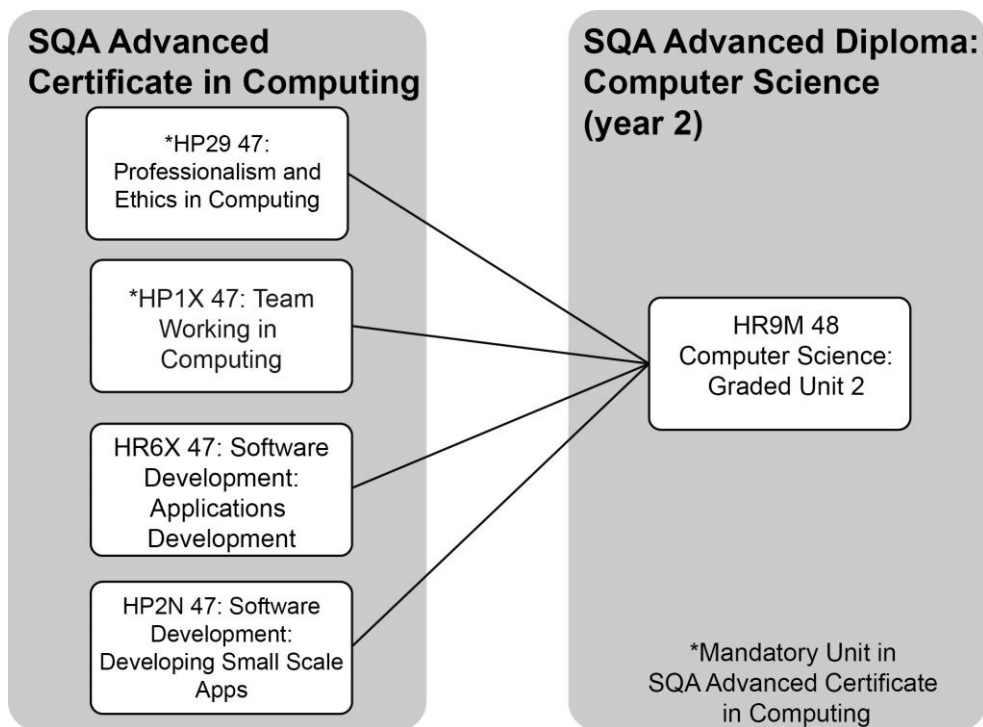
#### **Specific knowledge Outcomes related to core module**

- ◆ Describe the elements and characteristics of contemporary computer networks.
- ◆ Describe the OSI model and the TCP/IP protocol suite.
- ◆ Describe a range of WAN technologies.

### **HR9M 48 Computing: Graded Unit 2**

#### **Knowledge Outcomes**

- ◆ Prepare for employment in an IT/Computing-related post at technical or professional level in application/web development, technical or support.
- ◆ Develop a range of contemporary vocational skills, ie technical computing skills relating to the use and support of IT.



### **HP29 47 Professionalism and Ethics in Computing**

#### **Specific knowledge Outcomes related to core module**

- ◆ Apply codes of conduct and ethical standards relevant to computing practitioners.
- ◆ Describe contemporary legislation as it relates to computing practitioners.
- ◆ Evaluate ethical considerations in a relevant vocational context.

### **HP1X 47 Team Working in Computing**

#### **Specific knowledge Outcomes related to core module**

- ◆ Effectively participate in planning and organising a co-operative ICT project.
- ◆ Participate in the management of a co-operative ICT project and research and carry out agreed project tasks against the schedule and within the remit of the project role.
- ◆ Review own and group skills demonstrated throughout the co-operative ICT project.

### **HR6X 47 Software Development: Applications Development**

#### **Specific knowledge Outcomes related to core module**

- ◆ Analyse user requirements for creating an automated application interface.
- ◆ Produce an automated interface for use with an application software package.
- ◆ Carry out validation of data entry on automated procedures.
- ◆ Document the automated procedures.

### **HP2N 47 Software Development: Developing Small Scale Standalone Applications**

#### **Specific knowledge Outcomes related to core module**

- ◆ Design a small standalone interactive application.
- ◆ Construct a small standalone interactive application.
- ◆ Test and deploy a small standalone interactive application.

The SCQF level Descriptors have five characteristics which provide a reference point for determining the level of a qualification, learning programme, module or Unit of learning or for the recognition of prior learning. They are not intended to give precise or comprehensive statements of required learning for individual qualifications.

Each level is described in terms of its characteristic general Outcomes under five broad headings.

These are:

- ◆ Knowledge and understanding — mainly subject-based
- ◆ Practice (applied knowledge and understanding)
- ◆ Generic cognitive skills — eg evaluation, critical analysis
- ◆ Communication, numeracy and IT skills
- ◆ Autonomy, accountability and working with others

All of the core SQA Advanced Diploma in Computer Science SCQF level 8 Units have corresponding underpinning SCQF level 7 Units. Competency at SCQF level 8 can be evidenced throughout the core Units.

*Relational Database Management Systems (HP2J 48) and Software Development: Developing Websites for Multiplatform Use (HR9L 48)* provide a platform to demonstrate a range of routine skills, techniques, practices and/or materials associated with website development involving advanced or complex programming techniques.

All core SCQF level 8 Units will involve the learner carrying out routine lines of enquiry, development or investigation into professional level problems and issues.

*Computer Science Graded Unit 2* contributes heavily to at least two of the five headings. Above all individual learners will undertake critical analysis, evaluation and/or synthesis of ideas, concepts, information and issues within the context of a realistic project. To achieve a workable solution the learner will need to use a range of approaches to formulate evidence-based solutions/responses to defined and/or routine problems/issues. Finally, the learner will critically evaluate both the process and the product.

## **2.2 Inclusion of vendor qualifications within SQA Advanced Diploma in Computer Science**

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.

Vendors are now 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 2 illustrates the process of vendor accreditation.

## Figure 1: Vendor accreditation process

The Qualifications Committee imposed a cap on the contribution of vendor awards to national qualifications. The cap is 25% (seven credits for an SQA Advanced Diploma). 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 completed by any one of the SCQF—accreditation bodies in Scotland.

Grouping 3 within the qualification structure 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 Qualifications.

## 3 Aims of the qualification

The principal aim of this award is to reflect the increasing need to provide, for the information and communication technologies sector and the Scottish tertiary education sector, a student who can demonstrate a high proficiency in the areas of web development, software development and technical support which will enable them to thrive in today's global digital economy.

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 Diploma to degree programmes.

### 3.1 General aims of the qualification

The general aims of this award are:

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

### 3.2 Specific aims of the qualification

The specific aims of this award are:

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

### 3.3 Graded Unit

The Graded Unit for this award is designed to provide evidence that the candidate has achieved the following principal aims of SQA Advanced Diploma in Computer Science:

- ◆ 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.
- ◆ To provide the learner with the opportunity to develop the identified Core Skills within the context of a real project with external clients.



The SCQF level 8 Graded Unit is designed to evidence candidate's ability to plan, develop, implement and evaluate technical skills gained throughout their course. It does not ask the candidates to prove new skills but these would be developed, as the student would be expected to carry out independent scholarly activities such as further development of a taught programming language, development of new skills and research capabilities.

It will be project-based and will allow the candidate the flexibility to select from a variety of different projects, which are representative of the skills expected of a student undertaking this qualification. Some examples include: the practical implementation of a software deployment project for a small to medium sized company, producing a report/feasibility study on the implementation of IT systems for an organisation, or setting up a web or mobile-based application.

## 4 Recommended entry to the qualification

Entry to this qualification is at the discretion of the centre. The following information on prior knowledge, skills, experience or qualifications that provide suitable preparation for this qualification has been provided as guidance only.

Learners would benefit from having attained the skills, knowledge and understanding required by one or more of the following qualifications and/or experience:

- ◆ Passes in two relevant National Courses at SCQF level 6 (Higher) together with three relevant subjects at National 5.
- ◆ A related National Certificate at SCQF level 6.
- ◆ A relevant combination of vocational awards at appropriate levels.
- ◆ A mix of the above.

For example, a school leaver may be expected to possess two Higher level passes, (such as Computer Science and English) together with three passes at National 5 (such as Mathematics, Business Administration and History).

A college entrant would be expected to have completed a relevant National Certificate programme such as Digital Media Computing at SCQF level 6 or Computer Games Development at SCQF level 6. A combination of level 6 and level 5 National Units would also be appropriate. For example, a college entrant may possess a National Certificate in Mobile Technology at SCQF level 5 together with individual Unit passes at SCQF level 6.

Given the range of vocational awards available to learners, applicants who possess a range of smaller vocational qualifications should also be considered. For example, possession of relevant National Progression Awards (such as PC Passport and Computer Games Development at SCQF level 6) may be considered appropriate for entry to this award.

Applicants with a mixture of the above should also be considered for entry. For example, a candidate who possessed a pass in Computer Science at SCQF level 6 (Higher) together with one or more relevant NPA awards at SCQF levels 5 or 6 would, most likely, have the necessary knowledge and skills to benefit from undertaking this award.

Equivalent qualifications from other awarding bodies may also be acceptable, as would suitable vendor certifications.

Mature candidates with suitable work experience should also be considered subject to the Core Skill entry profile detailed in Section 4.1.

While success at SQA Advanced Certificate in Computing necessitates passing only 12 credits including the mandatory Units, it is recommended that learners achieve 15 credits before moving onto Year 2 of the SQA Advanced Diploma. The selection of the three additional credits should be done at a local level.

Recommended optional SCQF level 7 Units which may be useful for advancing into the second year of SQA Advanced Diploma in Computer Science include:

HP2G 47	<i>Database Design Fundamentals</i>
HR9X 47	<i>Developing Mobile Web Based Applications: An Introduction</i>
HR6X 47	<i>Software Development: Applications Development</i>
HR1V 47	<i>E-Commerce: Publishing Web Sites</i>
HP2E 47	<i>SQL: Introduction</i>
HP2N 47	<i>Software Development: Developing Small Standalone Applications</i>
HR8E 47	<i>Managing a Web Server</i>

Centres should be aware that learners wishing to gain direct entry onto to the second year of the award must apply for credit transfer using the recognised SQA quality procedures to ensure that the learner is credited with the appropriate SCQF level 7 Units to gain the named award.

## 4.1 Core Skills entry and exit profile

The Core Skill entry profile provides a summary of the associated assessment activities that exemplify why a particular level has been recommended for this qualification. The information would be used to identify if additional learning support needs to be put in place for learners whose Core Skills profile is below the recommended entry level or whether learners should be encouraged to do an alternative level or learning programme.

Core Skill	Recommended SCQF entry level	Associated assessment activities	SCQF exit level
Communication	(SCQF level 5)	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.	(SCQF level 6)
Numeracy	(SCQF level 5)	The Qualification Design Team have embedded the Core Skill of 'Numeracy' at SCQF level 5 within the mandatory Unit Computer Systems Fundamentals. A selection of 'Mathematics' Units which have Numeracy embedded at SCQF level 6 are also included in the framework as optional Units for centres wishing to offer a higher Core Skill exit level (refer to end of Section 4.1 for more information).	(SCQF level 5)
Information and Communication Technology	(SCQF level 5)	The Core Skill of 'ICT' at SCQF level 6 is embedded in the mandatory Unit Team Working in Computing.	(SCQF level 6)
Problem Solving	(SCQF level 5)	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 'Problem Solving' at SCQF level 6 is embedded in the mandatory Unit Troubleshooting Computing Problems.	(SCQF level 6)
Working with Others	(SCQF level 5)	The Core Skill of 'Working with Others' at SCQF level 6 is embedded in the mandatory Unit Team Working in Computing.	(SCQF level 6)

Core Skills can be embedded or signposted within Units. Embedded means the development of a Core Skill is incorporated into the Unit, and the Unit assessment 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 of the Unit assessments.

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.

Additional opportunities to attain the Core Skill of Numeracy at a higher SCQF level exist in the following Units:

- HR7E 47      *Mathematics: Calculus and Matrices for Computing*  
(embedded — SCQF level 6)
- HP1H 47      *Mathematics for Computing 1* (Using Number embedded — SCQF level 6,  
Using Graphical Information embedded — SCQF level 5)
- HR7R 47      *Mathematics for Interactive Computing: Essential Techniques* (signposted —  
SCQF level 6)

## **5 Additional benefits of the qualification in meeting employer needs**

This qualification was designed to meet a specific purpose and what follows are details on how that purpose has been met through mapping of the Units to the aims of the qualification. Through meeting the aims, additional value has been achieved by linking the Unit standards with those defined in National Occupational Standards and/or trade/professional body requirements. In addition, significant opportunities exist for learners to develop the more generic skills, known as Core Skills through doing this qualification.

## 5.1 Mapping of qualification aims to Units

To ensure that the aims of the national qualification are met, all specific aims are covered by the core Units defined in the award. Optional Units will however play pivotal roles in the extending the learner's depth of understanding with reference to specific aims.

- 1 To develop candidates' knowledge and skills in planning, developing and evaluating.
- 2 To develop employment skills, particularly relating to the IT industry.
- 3 To enable progression to further studies.
- 4 To develop and support study and research skills.
- 5 To develop strategies for learning and transferable skills.
- 6 To provide academic stimulus.
- 7 To support learners' continuing professional development.
- 8 To develop an awareness of current professional practices and technologies within the domain of computer science.
- 9 To develop a range of specialist knowledge and skills that reflects recent, in-demand developments in applications developments, web and mobile programming and database developments.
- 10 Where applicable, to provide learners with a range of underpinning knowledge that is supported by a wide range of vendors.
- 11 To offer articulation routes to a range of university degree programmes by developing scholarly activities and an independent learning environment.
- 12 To offer flexibility with the themes of Units across a range of computer science related areas.

Unit title and code	Aims											
	1	2	3	4	5	6	7	8	9	10	11	12
Developing Software: Introduction (HP1R 47)	✓	✓	✓	✓		✓	✓	✓	✓	✓		
Professionalism and Ethics in Computing (HP29 47)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Computer Systems Fundamentals (HP1T 47)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Troubleshooting Computer Problems (HP1V 47)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Team Working in Computing (HP1X 47)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Computing: Graded Unit 1: Exam (HR9J 47)			✓	✓		✓		✓				
Relational Database Management Systems (HP2J 48)		✓		✓		✓	✓	✓	✓	✓	✓	✓
Software Development: Developing Websites for Multiplatform Use (HR9L 48)		✓		✓		✓	✓	✓	✓		✓	✓
Managing a Web Server (HP2V 48)		✓		✓		✓	✓	✓	✓	✓		✓
Computer Science: Graded Unit 2: Project (HR9M 48)		✓		✓	✓	✓	✓	✓			✓	✓

## 5.2 Mapping of National Occupational Standards (NOS) and/or trade body standards

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

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 4–6. 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.

- |  |   |
|--|---|
| 4.1 Systems Architecture                             | 5.1 Systems Development   |
| 4.2 Data Analysis                                    | 5.2 Software Development  |
| 4.3 Human Needs Analysis                             | 5.3 IT/Technology Solution testing                                  |
| 4.4 Systems Analysis                                 | 5.4 Systems Integration   |
| 4.5 Data Design                                      | 5.5 IT/Technology systems installation, implementation and handover |
| 4.6 Human Computer Interaction/ Interface design     | 6.1 Information management  |
| 4.7 Systems Design                                   | 6.2 IT Security management  |
| 4.8 IT/Technology Infrastructure Design and Planning | 6.3 IT Disaster Recovery  |



	Unit title and code	National Occupational Standards																
		4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	
SQA Advanced Diploma in Computer Science (Year 1)	Developing Software: Introduction HP1R 47		✓		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		
	Professionalism and Ethics in Computing HP29 47														✓	✓		
	Computer Systems Fundamentals HP1T 47	✓					✓			✓		✓		✓				
	Troubleshooting Computer Problems HP1V 47	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Computing: Graded Unit 1 HR9J 47	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Team Working in Computing HP1X 47	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SQA Advanced Diploma in Computer Science (Year 2)	Relational Database Management Systems HP2J 48		✓			✓	✓				✓	✓						
	Software Development: Developing Websites for Multiplatform Use HR9L 48				✓	✓	✓	✓			✓	✓		✓				
	Managing a Web Server HP2V 48							✓		✓	✓		✓			✓		
	Computer Science: Graded Unit 2: Project (HR9M 48)		✓			✓	✓		✓	✓	✓	✓						

### 5.3 Mapping of Core Skills development opportunities across the qualification

Unit code	Unit title	Communication		Numeracy		ICT		Problem Solving			Working with Others	
		Written	Oral	Using Number	Using Graphical Information	Accessing Information	Providing/Creating information	Critical Thinking	Planning and Organising	Reviewing and Evaluating	Working Co-operatively with Others	Reviewing Co-operative Contribution
HP1R 47	Developing Software: Introduction							Embedded (SCQF 6)				
HP1X 47	Team Working in Computing	Signposted (SCQF 6)	Signposted (SCQF 6)			Embedded (SCQF 6)	Embedded (SCQF 6)				Embedded (SCQF 6)	Embedded (SCQF 6)
HP1V 47	Troubleshooting Computing Problems							Embedded (SCQF 6)	Embedded (SCQF 6)	Embedded (SCQF 6)		
HP1T 47	Computer Systems Fundamentals			Embedded (SCQF 5)	Embedded (SCQF 5)							
HP29 47	Professionalism and Ethics in Computing	Signposted (SCQF 6)	Signposted (SCQF 6)			Signposted (SCQF 6)	Signposted (SCQF 6)					
HP2J 48	Relational Database Management Systems					Signposted (SCQF 6)	Signposted (SCQF 6)	Signposted (SCQF 6)	Signposted (SCQF 6)	Signposted (SCQF 6)		
HR9L 48	Software Development: Developing Websites for Multiplatform Use	Signposted (SCQF 6)	Signposted (SCQF 6)			Signposted (SCQF 6)	Signposted (SCQF 6)	Signposted (SCQF 6)	Signposted (SCQF 6)	Signposted (SCQF 6)		
HP2V 48	Managing a Web Server					Signposted (SCQF 6)	Signposted (SCQF 6)	Signposted (SCQF 6)	Signposted (SCQF 6)	Signposted (SCQF 6)		
HR9M 48	Computer Science: Graded Unit 2: Project							Embedded (SCQF 6)	Embedded (SCQF 6)	Embedded (SCQF 6)		
J552 48	Programming for Data							Embedded (SCQF 6)	Embedded (SCQF 6)	Embedded (SCQF 6)		

## 5.4 Assessment Strategy for the qualification

The Units listed below are the mandatory Units which when added to the mandatory SQA Advanced Certificate in Computing Units form the 14 mandatory credits for the SQA Advanced Diploma in Computer Science.

Unit	Assessment			
	Outcome 1	Outcome 2	Outcome 3	Outcome 4
Relational Database Management Systems (HP2J 48)	Closed-book assessment: candidates will provide evidence by completing 20 multiple-choice questions.	Open-book assessment - candidates will produce a report based on practical based case study		
Software Development: Developing Websites for Multiplatform Use (HR9L 48)	Open-book assessment - candidates will produce a report (of approximately 1000 words) based on practical based case study.			
Managing a Web Server (HP2V 48)	Open-book assessment - candidates will produce a short report (of approximately 500 words) based on practical based case study.			
SQA Advanced Diploma in Computer Science: Graded Unit 2 (Project) (HR9M 48)	<p>Project: The candidate will be required to provide documentation which supports evidence of the candidate's ability to plan, develop, implement and evaluate technical skills gained throughout the course.</p> <p>Delivering centres may wish to consider enrolling external clients to support these projects as this has always proved to be beneficial for centre, external client and above all, the candidate.</p>			

This award does not impose a rigid delivery schedule. However colleges should be aware that if a holistic, natural approach to assessment is adopted, the same case study can be adopted to cover the requirements of three of the four core Units: *Relational Database Management Systems* (HP2J 48), *Software Development: Developing Websites for Multiplatform Use* (HR9L 48) and *Managing a Web Server* (HP2V 48). This could take the form of cross assessing the Units, but it is more likely that centres will adopt the same scenario, but keep each Unit assessment instruments separate.

## 6 Guidance on approaches to delivery and assessment

The contents of the SQA Advanced Diploma in Computer Science have been updated to reflect contemporary technologies and methodologies. The award has attempted to blend traditional underpinning concepts of problem solving (in terms of software developments, networking and technical support) whilst developing these with in a number of technological advancements including:

- ◆ growth of Web 2.0 technologies
- ◆ increase in social media
- ◆ increase in mobile technology
- ◆ increase in focus on software development

The new 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 mandatory 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 with regards to the many optional Units. The centre will in essence be able to offer an award which, although constricted by the core Units, is flexible to offer an award which genuinely meets local needs.

Assessment 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 learner '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 '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.

All of the second year core Units are double credits. This works well as a method of reducing the quantity of assessments, without compromising quality, as well as allowing the learner greater time to carry out in-depth scholarly activities.

Centres should be encouraged to source external clients to support the SQA Advanced Diploma in Computer Science Graded Unit. As well as providing a platform for developing 'soft skills', the use of external clients improves the quality of submitted projects and prepares the learner for employment.

## 6.1 Sequencing/integration of Units

Providing the mandatory Units of the award are covered, centres are free to devise their own sequence for delivery of Units. It is recommended however that SCQF level 7 Units are undertaken in Year 1 with SCQF level 8 Units concentrated towards the end of Year 2. Where possible, learners should complete a SCQF level 7 Unit before undertaking an associated SCQF level 8 Unit. For example:

Semester 1 SQA Advanced Diploma (Year 1)	Semester 2 SQA Advanced Diploma (Year 1)	Core Unit in SQA Advanced Diploma (Year 2) framework
Database Design Fundamentals (HP2G 47)	SQL: Introduction (HP2E 47)	Relational Database Management Systems (HP2J 48)
It is suggested that if the centre chooses Database Design Fundamentals and SQL: Introduction that these are integrated.		
Developing Mobile Web Based Application: An Introduction (HR9X 47)		Software Development: Developing Websites for Multiplatform Use (HR9L 48)
Centres should be aware that there are a number of Units within this component of the award which could be integrated. Human Computer Interaction (HR8C 47) could be assessed along with both Web Development and Mobile Development Units.		
	Managing a Web Server(HR8E 47)	Managing A Web Server (HP2V 48)
A number of the vendor options could be used to support this Unit.		
SD: Applications Development (HR6X 47)		SQA Advanced Diploma in Computer Science: Graded Unit 2 (Project) (HR9M 48)
The Graded Unit will be assessed separately. Previous assessment used to provide evidence should not be used as evidence for this particular Unit. The learners should be encouraged to source external clients from the surrounding area. As the Graded Unit is a means of contextualising the other core Units, it could be taught throughout the year. This longitudinal approach will allow the student more time to carry out scholarly activities to support the submission.		

In selecting combinations of optional Units, centres are also likely to consider issues such as:

- ◆ Articulation arrangements with universities
- ◆ Needs of employers
- ◆ Resources available to the centre

An example course schedule plan is suggested below, based upon a 2 Year course with each year comprising of two semesters. Note that centres are free to devise their own alternative course plans:

**Key c = core Unit, o = optional Unit**

<b>YEAR 1: SQA Advanced Diploma in Computer Science</b>							
	<b>Semester 1</b>	<b>level</b>	<b>credits</b>		<b>Semester 2</b>	<b>level</b>	<b>credits</b>
<b>c</b>	Developing Software: Introduction (HP1R 47)	7	1	<b>c</b>	SQA Advanced Certificate in Computing: Graded Unit 1: Exam (HR9J 47)	7	1
<b>c</b>	Computer Systems Fundamentals (HP1T 47)	7	1	<b>c</b>	Team Working in Computing (HP1X 47)	7	1
<b>c</b>	Professionalism and Ethics in Computing (HP29 47)	7	1	<b>c</b>	Troubleshooting Computer Problems (HP1V 47)	7	1
<b>o</b>	Database Design Fundamentals (HP2G 47)	7	1	<b>o</b>	SQL: Introduction (HP2E 47)	7	1
<b>o</b>	Computing: Introduction to Project Management (HP21 47)	7	1	<b>o</b>	Managing a Web Server (HR8E 47)	7	1
<b>o</b>	Human Computer Interaction (HR8C 47)	7	1				
<b>o</b>	E-Commerce: Publishing Web Sites (HR1V 47)					7	2
<b>o</b>	Developing Mobile Web Based Applications: An Introduction (HR9X 47)					7	2

YEAR 2: SQA Advanced Diploma in Computer Science							
	Semester 1	level	credits		Semester 2	level	credits
c	Software Development: Developing Websites for Multiplatform Use (HR9L 48)	8	2	c	SQA Advanced Diploma in Computer Science: Graded Unit 2 (Project) (HR9M 48)	8	2
c	Relational Database Management Systems (HP2J 48)	8	2	o	Ethical Hacking (J0L2 47)	7	1
c	Managing a Web Server (HP2V 48)	8	2	o	Mathematics for Computing 1 (HP1H 47)	7	1
o	Cloud Computing (HP1Y 47)	7	1	o	Systems Development: Introduction (HR8M 47)	7	1
				o	Digital Forensics (J0L3 47)	7	1
o	Software Development: Object Oriented Programming (HP2L 48)					8	2

- 1 All instruments of assessment used within this Group Award should be internally verified, using the appropriate policy within the centre and the guidelines set by SQA.
- 2 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 and Quality Assurance for Colleges of Further Education* ([www.sqa.org.uk](http://www.sqa.org.uk))

## 6.2 Recognition of Prior Learning

SQA recognises that learners gain knowledge and skills acquired through formal, non-formal and informal learning contexts.

In some instances, a full Group Award may be achieved through the recognition of prior learning. However, it is unlikely that a learner would have the appropriate prior learning and experience to meet all the requirements of a full Group Award.

The recognition of prior learning may **not** be used as a method of assessing in the following types of Units and assessments:

- ◆ SQA Advanced Graded Units
- ◆ Course and/or external assessments
- ◆ Other integrative assessment Units (which may or not be graded)
- ◆ Certain types of assessment instruments where the standard may be compromised by not using the same assessment method outlined in the Unit
- ◆ Where there is an existing requirement for a licence to practice
- ◆ Where there are specific health and safety requirements
- ◆ Where there are regulatory, professional or other statutory requirements
- ◆ Where otherwise specified in an assessment strategy

More information and guidance on the *Recognition of Prior Learning* (RPL) may be found on our website [www.sqa.org.uk](http://www.sqa.org.uk)

The following sub-sections outline how existing SQA Unit(s) may contribute to this Group Award. Additionally, they also outline how this Group Award may be recognised for professional and articulation purposes.

### 6.2.1 Articulation and/or progression

Articulation arrangements exist between a number of Scottish, UK and international universities where SQA Advanced Certificates and Diplomas will be accepted as advanced entry to either the second or third year of a related degree programme. Depending on the specific degree programme, certain units may be required as part of the SQA Advanced Certificate/Diploma. The optional section of the framework is sufficiently broad to ensure that centres are able to comply with reasonable articulation requests. A high proportion of our candidates have articulated to degree programmes and successfully completed them.

### 6.2.2 Professional recognition

SQA Advanced Diplomas are recognised by many professional bodies. Learners achieving an SQA Advanced Diploma may meet the professional body entry requirements. Learners may also gain partial and full exemptions to professional body exams.



## 6.3 Opportunities for e-assessment

Where appropriate the centre should try to adopt ICT. The use of social media such as blogs should be encouraged. Innovative methods such as the use of video or audio evidence should be used where appropriate.

As part of an assessment strategy, it makes sense to investigate the option of e-assessment to support the programme. E-assessment may take a number of forms, and while it may be feasible in the future to conduct all assessment in an online format, currently some formats are more amenable to e-assessment than others.

The most obvious format is that of objective tests (most frequently Multiple-Choice tests), and some SQA Units already have an Evidence Requirement mandating the use of this type of test. Centres should adopt tests supported by SOLAR ([www.sqasolar.org.uk](http://www.sqasolar.org.uk)) where appropriate.

## 6.4 Support materials

A list of existing ASPs is available to view on SQA's website.

A range of Assessment Support Packs (ASPs) have been produced for a number of mandatory and optional Units in this Group Award. These packs are available on the SQA secure website and access can be sought through the SQA co-ordinator in each centre.

## 6.5 Resource requirements

Individual centres may wish to develop their own strategies to support this programme. However given the development of cloud computing, centres may wish to form consortiums which will spread both CPD and technical needs.

Completion of this qualification would not be possible without considering the core resources which are essential.

Web Server — students must be given access to a server local or remote and be able to experiment and test how these servers operate and support a platform supporting differing web tools and languages. It is recommended that centres could use a Web Server of a current standard to accommodate server-side scripting.

This award has been developed with vendor neutrality and is expressed in generic terms. However centres may consider delivery within a Microsoft context using Internet Information Server (IIS) or Apache under a UNIX/Linux context, with candidates implementing a Linux, Apache, MySQL and PHP (LAMP) environment, this type of environment currently being the most popular and secure web server application platform.

Database access can be done by giving the candidate a predefined database or by the candidate composing a database relevant to their chosen project.

The actual database package used could be at least ODBC (Open Database Connectivity), JDBC (Java Database Connectivity) or CFML (ColdFusion Mark-up Language) compliant.

SQL/ORACLE database schemata supporting a front-end interface such as MySQL Browser, SQL Workbench or such like would be appropriate. Centres cannot offer this award by simply utilising Microsoft ACCESS. Most if not all of these tools can be found 'free of charge' but technical support is limited.

Unit involved in the teaching of programming languages should consider Java or C# or equivalent if the majority of the centres learners intend carrying on in tertiary education.

In addition, universities have indicated that learners should have ideally completed HP1H 47 *Mathematics for Computing 1* and/or HR6T 48 *Mathematics for Computing 2*.

## 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 assessments used within this/these qualification(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/GuideToAssessment](http://www.sqa.org.uk/GuideToAssessment)).

## 8 Glossary of terms

**Embedded Core Skills:** is where the assessment evidence for the Unit also includes full evidence for complete Core Skill or Core Skill components. A learner successfully completing the Unit will be automatically certificated for the Core Skill. (This depends on the Unit having been successfully audited and validated for Core Skills certification.)

**Finish date:** The end of a Group Award's lapsing period is known as the finish date. After the finish date, the Group Award will no longer be live and the following applies:

- ◆ candidates may not be entered for the Group Award
- ◆ the Group Award will continue to exist only as an archive record on the Awards Processing System (APS)

**Graded Unit:** Graded Units assess learners' 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 learners to retain and adapt their skills and knowledge.

**SQA credit value:** The credit value allocated to a Unit gives an indication of the contribution the Unit makes to an SQA Group Award. An SQA credit value of 1 given to an SQA Unit represents approximately 40 hours of programmed learning, teaching and assessment.

**SCQF:** The Scottish Credit and Qualification Framework (SCQF) provides the national common framework for describing all relevant programmes of learning and qualifications in Scotland. SCQF terminology is used 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:** SCQF credit points provide a means of describing and comparing the amount of learning that is required to complete a qualification at a given level of the Framework. One National Unit credit is equivalent to 6 SCQF credit points. One National Unit credit at Advanced Higher and one SQA Credit (irrespective of level) is equivalent to 8 SCQF credit points.

**SCQF levels:** The level a qualification is assigned within the framework is an indication of how hard it is to achieve. The SCQF covers 12 levels of learning. SQA Advanced Certificates and SQA Advanced Diplomas are available at SCQF levels 7 and 8 respectively. SQA Advanced Units will normally be at levels 6–9 and Graded Units will be at level 7 and 8. National Qualification Group Awards are available at SCQF levels 2–6 and will normally be made up of National Units which are available from SCQF levels 2–7.

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

**Signposted Core Skills:** refers to opportunities to develop Core Skills arise in learning and teaching but are not automatically certificated.

## 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
14	<b>Addition of Optional Unit:</b> HT04 46 – Statistics for Science 1 added as a Group 2 Optional unit.	07/07/23
13	<b>Addition of Optional Unit:</b> HT05 47 - Web Development: Essential Content added as Group 4 Optional unit.	14/09/21
12	<b>Addition of Optional Units:</b> HR8R 47 - Website Design: Multimedia Content Creation added as Group 1 Optional unit.	24/08/21
11	<b>Addition of Optional Units:</b> Cryptography: Practical Applications - J550 47, Programming for Data - J552 48 and Machine Learning - J551 49 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 Unit:</b> J3CP 47 Data Flow added as an Optional unit	24/03/20
08	<b>Addition of Optional Unit:</b> J1S1 47 Data Security added as an Optional unit.	09/01/20
07	<b>Revision of Unit:</b> J1CL 47 Firewall Essentials (finish date 31/07/2021) has been replaced by J3CN 47 Firewall Essentials and credit value has been amended from 1 to 2 credits.	06/11/19
06	<b>Addition of Optional Unit:</b> HP2H 48 Self Describing Data (XML) has been added to the Group 4 Options	23/11/18
05	<b>Addition of Optional Units:</b> HR7M 47 Web Development Fundamentals HP1J 48 Routing Technology HP1M 48 Networking Technology HR79 48 Computer Operating Systems 2 HP2T 48 Web Development: Dynamically Generated Content HT06 47 Professional Career Development in the IT Industry HR9T 47 Big Data  Added to Group 4 Local Options	26/10/18
04	<b>Addition of Optional Units:</b> J1CD 47 Artificial Intelligence J1CE 47 Computer Architecture	30/08/18

	<p>J1CF 47 Computer Operating Systems  J1CG 48 Computer Operating Systems  J1CH 47 Computer Programming  J1CJ 47 Emerging Technologies &amp; Experiences  J1CL 47 Firewall Essentials  J1CM 47 Internet of Things  J1CN 47 Machine Learning  J1CP 48 Machine Learning  J1CR 47 Robotics: Fundamentals</p> <p>have been added to the Group 1 Options</p>	
03	<p><b>Addition of Optional Unit:</b> HP33 48 Open Source Operating Systems: Introduction to Command Line Administration has been added to the Group 1 options</p>	23/07/18
02	<p><b>Unit Revisions:</b> The unit Computer Forensics Fundamentals (HP28 47) has been revised by unit Digital Forensics (J0L3 47). The unit Ethical Hacking Fundamentals (HR90 47) has been revised by unit Ethical Hacking (J0L2 47). Centres should enter candidates for the revised units from 1 st 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

## Acknowledgement

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

## 9 General information for learners

This section will help you decide whether this is the qualification for you by explaining what the qualification is about, what you should know or be able to do before you start, what you will need to do during the qualification and opportunities for further learning and employment.

This SQA Advanced Diploma in Computer Science is suitable for a range of learners including:

- ◆ School leavers who wish to embark on a course which will lead to either higher education or IT industry employment.
- ◆ Employed or unemployed adults wishing to retrain for a career in technical support.

By undertaking the award, you are also expected to continue to benefit from the many existing arrangements that exist between FE colleges and Universities, for articulation into the 2nd or 3rd year of University degree programmes.

At the discretion of a centre, you may be permitted to enter the award by waiving some of the entry requirements — based on your previous experience.

To achieve the award you will need to pass a minimum of 30 credits from the SQA Advanced Diploma in Computer Science award including all 14 of the mandatory credits.

Units are assessed by a combination of exams, projects and logs/portfolios. Included within the mandatory Units are a *Computing: Graded Unit 1* (Examination) in Year 1 and a *Computer Science: Graded Unit 2* (Project) in Year 2.

In the first year of the award, you will learn a range of introductory computing topics relating to computer systems and how to troubleshoot faults on them. You will also learn about team working and some of the legislation that governs securing the electronic data that is stored on systems.

In the second year of the award, you will demonstrate a range of routine skills, techniques, practices and/or materials associated with website development involving advanced or complex programming techniques.