National Unit Specification

General information

Unit title: Computing: Install and Maintain Computer Software (SCQF level 5)

Unit code: J51B 45

Superclass: CA

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Source: Scottish Qualifications Authority

Version: 02

Unit purpose

The purpose of this unit is to introduce learners to the theoretical and practical aspects of computer software. Also, how computer software is installed, configured, and maintained, whilst taking into account how software is kept up to date and secure.

This is a non-specialist introductory unit intended for learners with an interest in the installation and maintenance of computer software. This unit is mandatory in the National Progression Award in Computer Networks at SCQF level 5. However, it may be delivered on a standalone basis.

Learners will cover the fundamental aspects of a range of software, such as operating systems and applications and the variety of devices onto which software can be installed, configured, maintained and secured.

On completion of this unit, learners may progress to other computing and IT related units at SCQF level 6 and 7.

Outcomes

On successful completion of the unit the learner will be able to:

1 Identify a range of software types and their uses.
2 Install and configure a range of software as part of a computer system.
3 Maintain a range of software as part of a computer system.

National Unit Specification: General information (cont)

Unit title: Computing: Install and Maintain Computer Software (SCQF level 5)

Credit points and level

1 National Unit credit at SCQF level 5: (6 SCQF credit points at SCQF level 5)

Recommended entry to the unit

Entry to this unit is at the discretion of the centre. Learners should possess basic digital literacy and IT skills and have a basic awareness of computer systems and software. This may be evidenced by possession of relevant Computing and/or ICT skills at SCQF level 4 or above.

Core Skills

Achievement of this Unit gives automatic certification of the following Core Skills component:

Core Skill component	Critical Thinking at SCQF level 5 Accessing Information at SCQF level 5

There are also opportunities to develop aspects of Core Skills which are highlighted in the support notes of this unit specification.

Context for delivery

If this unit is delivered as part of a group award, it is recommended that it should be taught and assessed within the subject area of the group award to which it contributes.

This unit is part of the National Progression Award in Computer Networks at SCQF level 5. As such, it may be delivered alongside other component units such as J1FA 45 *Computing: Install and Maintain Computer Hardware* and J519 45 *Computing: Computer Networking Fundamentals*. In this circumstance, teaching, learning and assessment may take place on a holistic basis for all three units. Please see the support notes section of this document for further details.

Equality and inclusion

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

Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**.

National Unit Specification: Statement of standards

Unit title: Computing: Install and Maintain Computer Software (SCQF level 5)

Acceptable performance in this unit will be the satisfactory achievement of the standards set out in this part of the unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

Outcome 1

Identify a range of software types and their uses.

Performance criteria

(a) Identify the types and features of operating system software
(b) Identify the types and features of application and/or mobile software
(c) Identify and describe Software as a Service (SaaS)
(d) Identify methods for installing a range of software
(e) Identify methods for software licensing and registration
(f) Identify methods for securing installed software

Outcome 2

Install and configure a range of software as part of a computer system.

Performance criteria

(a) Perform pre-installation procedures
(b) Identify a range of installation media
(c) Install and configure an operating system
(d) Install and configure application and/or mobile software
(e) Troubleshoot an operating system using identified tools
(f) Troubleshoot application and/or mobile software using identified tools

Outcome 3

Maintain a range of software as part of a computer system.

Performance criteria

(a) Maintain and upgrade an operating system using identified tools
(b) Maintain and upgrade application and/or mobile software using identified tools
(c) Implement security features of an operating system
(d) Implement security features of application and/or mobile software

National Unit Specification: Statement of standards (cont)

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Evidence requirements for this unit

Evidence is required to demonstrate that learners have achieved all outcomes and performance criteria.

Assessors should use their professional judgement, subject knowledge and experience, and understanding of their learners to determine the most appropriate ways to generate evidence and the conditions and contexts in which they are used.

The evidence requirements for this unit will consist of two types of evidence: **knowledge evidence** and **product evidence**.

The **knowledge evidence** will relate to outcome 1 and all associated performance criteria. It may take any appropriate format. The evidence for this unit may be written or oral or a combination of these. Evidence may be captured, stored, and presented in a range of media and formats. Particular consideration should be given to digital formats and the use of multimedia. The focus of the knowledge evidence is breadth, not depth, so the amount of evidence should be the minimum consistent with the performance criteria. It may be produced with access to reference materials over the life of the unit.

Sampling of knowledge is permissible in certain contexts, such as when traditional testing is used to generate the evidence. When sampling is used, the sampling frame must be broad enough to ensure that every outcome is covered. In this case, the test must be carried out under controlled, supervised, and timed conditions, without access to reference materials.

The **product evidence** will relate specifically to outcome 2 and outcome 3 and all associated performance criteria. Product evidence will take the form of the preparation, installation and configuration of computer software. Evidence that demonstrates that the software installation has been maintained, upgraded and secured using appropriate methods, must also be produced.

Whenever possible, evidence should be a naturally occurring by-product of teaching and learning. However, it must be produced by the learner. Authentication must be used where this is uncertain.

There are no time limitations on the production of evidence. The evidence may be produced at any time during the life of the unit.

The SCQF level of this unit provides additional context on the nature of the required evidence and the associated standards. The level descriptors should be used (explicitly or implicitly) when making judgements about the evidence.

The *Guidelines on Approaches to Assessment* (see the support notes section of this specification) provide specific examples of instruments of assessment.

National Unit Support Notes

Unit title: Computing: Install and Maintain Computer Software (SCQF level 5)

Unit support notes are offered as guidance and are not mandatory.

While the exact time allocated to this unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this unit

The overall aim of this unit is to develop knowledge and skills of learners in the theoretical and practical aspects associated with installation, configuration and troubleshooting of computer software. Emphasis is also placed upon how software can be maintained and upgraded, as well as how security features of the software can be enabled for the protection of end-user devices.

The context for this unit is based upon the installation, configuration and troubleshooting of computer software that can be installed on a variety of devices, for example within a home network or small office environment. A range of software can be installed within these environments that needs maintained and updated on a regular basis, as well as have appropriate security features enabled for the protection of that device, and any other devices that exist, for example, as part of a wider computer network.

As this unit is delivered as part of the NPA in Computer Networks, there is the potential for the teaching, learning and assessment to be integrated across the component units of the NPA.

This unit should ideally be delivered alongside J51A 45 *Computing: Install and Maintain Computer Hardware*, as this provides learners with the opportunity to install a range of software onto hardware systems that are installed, configured and maintained as part of that assessment.

National Unit Support Notes (cont)

Unit title: Computing: Install and Maintain Computer Software (SCQF level 5)

Outcome 1

The focus for outcome 1 is to identify the range of different types of software that are available for installation onto different devices. This should begin with learners identifying operating systems software, which can either be closed or open source systems, ie Linux or Windows, and the basic features that these systems have to offer. The focus should then shift to application software that can be installed onto an operating system, as well as the different types of medium that can be used for installation, for example, either by online installation or executable file from a disc-based medium. Alternatively, learners also have the opportunity to install applications (or 'apps') onto mobile devices. Learners should, at this point, differentiate between software that is installed locally onto a device and software that is available online via cloud services (or SaaS), as well as popular SaaS providers such as Google and Microsoft. Learners should be made aware of the legal implications of illegal/pirated software and the validation and registration steps to ensure that any installed software is valid and legal. This may also provide the opportunity of discussing licensing methods associated with closed and open source software, for example, General Public Licensing (GNU) and the implications for software distribution. Outcome 1 should finish off with awareness being raised of the importance of updating and securing software and the implications of having insecure software as part of a wider network.

Outcome 2

Learners should take the concepts learned in outcome 1 and apply them to the practical aspects of installing a range of software throughout outcome 2. This should begin by identifying software and the medium for installation as well as pre-installation checks, for example, ensuring the hardware meets the required specification of the software to be installed. This can continue with the learner installing an operating system, which they will then configure and troubleshoot, as necessary. It can either be a closed or open source system, for example, Windows or Linux. Learners may wish to configure the system by installing additional options as part of installation, or else choose a different installation scheme, for example, custom partitioning.

Once an operating system has been installed, the learner can then choose to install an application package, for example, a suite of office software. Optionally, learners may wish to install a mobile application onto a mobile device, for example, tablet or phone. Again, once the application has been installed, learners must configure and troubleshoot the software, as necessary. This may involve custom installation and options for usage if the software is installed on a multi-user system.

Alternatively, learners may wish to use a virtual environment. For example, learners may wish to install and configure virtualisation software, such as Oracle VirtualBox, onto which they can then install, configure and troubleshoot an operating system.

In any case, learners must take the necessary steps to ensure that any software being installed is valid and that the necessary steps are being taken to register the software.

National Unit Support Notes (cont)

Unit title: Computing: Install and Maintain Computer Software (SCQF level 5)

Outcome 3

Finally, in outcome 3, the learner will be making sure that any software that is installed as part of outcome 2, is being maintained appropriately as well as being upgraded and secured. For example, after the installation of an operating system, it must be upgraded to the latest version and any security patches being applied using the features of the operating system must be adequate. If using Windows, the Windows update tool can be used, or if using Linux, a software manager/package tool can be used.

The same must be applied to any software application package that is installed. Appropriate security features must then be implemented (same as when installing an operating system). Users must be added with appropriate levels of security, permissions, and passwords, for example administrative and standard system users. When securing software, learners must ensure that, again, the software is up to date and, if necessary, has been patched, encryption settings have been enabled and that firewalls and anti-virus mechanisms are enabled. This is especially important if the system is joining a computer network, where mitigation of viruses and/or malware is of importance.

Guidance on approaches to delivery of this unit

A practical hands-on approach to learning should be adopted to engage learners and exemplify key concepts. However, all practical activities in outcomes 2 and 3 should be underpinned with appropriate knowledge from outcome 1 before learners commence these activities. Hence, outcomes should be delivered in sequential order.

Learning should be a mix of tutor-led and learner-led learning. It is anticipated that some initial introduction and explanation will be required for each outcome. However, there is significant scope for learners to research and explore the topics once this initial seeding has taken place. Tutors should expect some independent learning to take place and support students with this where appropriate. Some elements may require more tutor exposition, perhaps supported by video resources as well as worked examples.

Learners should ideally have access to a practical lab environment for outcomes 2 and 3, where they can access devices that will allow the installation of operating systems and software, in order to gain hands-on experience of installing a range of software. The environment should allow access to the Internet for the purposes of updating and securing the software. Alternatively, students may wish to use a virtual environment for the installation of operating systems and software. If they choose to do so, necessary steps must be taken to ensure that the virtual environment does not cause any disruption with the infrastructure/network on which it is running.

The delivery of each outcome is at the discretion of the centre. However, it is suggested that the time distribution for each of the outcomes should be as follows:

- Outcome 1: 10 hours
- Outcome 2: 15 hours
- Outcome 3: 15 hours

National Unit Support Notes (cont)

Unit title: Computing: Install and Maintain Computer Software (SCQF level 5)

The biggest proportion of time should be dedicated to outcomes 2 and 3, which focus on the more significant practical aspects of installing software.

Throughout this unit learner activities should relate to their personal or vocational interests. Learners should be encouraged to become confident with as wide a range of software as possible.

Guidance on approaches to assessment of this unit

Evidence can be generated using different types of assessment. The following are suggestions only. There may be other methods that would be more suitable to learners.

Centres are reminded that prior verification of centre-devised assessments would help to ensure that the national standard is being met. Where learners experience a range of assessment methods, this helps them to develop different skills that should be transferable to work or further and higher education.

A traditional approach to assessment would comprise a multiple-choice test for knowledge evidence (outcome 1) and a practical assignment for the product evidence (outcomes 2 and 3).

The multiple-choice assessment should ideally take place towards the end of unit. The test could consist of a number of selected response questions, chosen from across all outcomes and their performance criteria. To ensure adequate coverage, all performance criteria should be tested. For example, a multiple-choice test, consisting of 25 items, each with four options, could be used. In this case, the pass mark would be 15 out of 25 (60%). The test would be timed (45 mins) and carried out under controlled closed-book conditions, without access to reference material. Where re-assessment is required, it should contain a significantly different sample selected from the range of mandatory content (at least 10% difference).

It is recommended that a holistic approach is taken to product evidence, and that outcomes 2 and 3 are assessed as a single practical project undertaken over a designated period of time. This could be achieved by a learner following one brief/task through all the stages of the planning and installation of software based on given requirements. The brief/task should be supplied by the assessor and need not be overly complex. It should, however, give the learner the opportunity to cover all of the performance criteria for outcomes 2 and 3. The supplied brief/task can cover a range of contexts, for example the installation of software as part of a computer system (PC or server) for a small home office or for a more formal office environment. There may also be opportunities to develop the task in the context of enterprise, employability or citizenship skills.

As this unit is delivered as part of the NPA Computer Networks, the supplied task may be of a wider remit in order to include assessment from J51A 45 *Computing: Install and Maintain Computer Hardware* and J519 45 *Computing: Computer Networking Fundamentals*.

An assessor observation checklist could be used to record that the assessment tasks for all the outcomes have been undertaken successfully by the learner. An assessor should sign and date each learner's checklist.

More contemporary approaches to assessment include the use of a web log or the creation of a portfolio. The web log would record learning over the life of the unit. Practical work could be recorded on the blog in a variety of ways. The completed blog would have to satisfy all performance criteria. The blog would be assessed on a pass/fail basis using a checklist. Alternatively, a portfolio could be used as a repository for the identifications required in outcome 1, and the output from learners' practical work in Outcome 2 and Outcome 3. The completed portfolio would have to satisfy all performance criteria. The portfolio would be assessed on a pass/fail basis using a checklist.

Formative assessment can be used to assess learners' knowledge at various stages in the unit. An ideal time to gauge their knowledge would be at the end of each outcome. This assessment could be delivered through an item bank of selected response questions, providing feedback to learners (when appropriate).

Authentication may take various forms including, but not limited to, oral questioning and plagiarism checks. Where evidence is generated under loosely controlled conditions (for example out of class) then a statement of authenticity should be provided by the learner to verify the work as their own.

Opportunities for e-assessment

E-assessment may be appropriate for some assessments in this unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the evidence requirements are met, regardless of the mode of gathering evidence. The most up-to-date guidance on the use of e-assessment to support SQA's qualifications is available at **www.sqa.org.uk/e-assessment**.

Opportunities for developing Core and other essential skills

This unit will provide opportunities for leaners to develop the Core Skills of *Problem Solving* and *Information and Communication Technology*.

This unit will also provide opportunities for leaners to develop Core Skills in Digital Literacy due to the variety of software that they may use. Enterprise, employability, and citizenship could also be incorporated depending on the nature of the task/brief

The Critical Thinking component of Problem Solving and Accessing Information component of Information and Communication Technology at SCQF level 5 are embedded in this unit. When a learner achieves these units, their Core Skills profile will also be updated to include these components.

History of changes to unit

Version	Description of change	Date
02	Core Skills Components Critical Thinking and Accessing Information at SCQF level 5 embedded.	09/12/20

Unit template: 200617

General information for learners

Unit title: Computing: Install and Maintain Computer Software (SCQF level 5)

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

This unit will introduce you to the basic theoretical and practical elements that comprise the installation, configuration and maintenance of computer software. You will learn about the fundamental aspects of the varieties of computer software and the underpinning theoretical knowledge of the software installation and maintenance process. This knowledge will be taken and applied to practical aspects of computer software installation, for example, different types of operating systems and application software. You will learn to install, configure and maintain computer software in a variety of contexts, for example a small office or home network as well as considerations for upgrading and securing the software

The unit comprises three outcomes:

1 Identify a range of software types and their uses.
2 Install and configure a range of software as part of computer system.
3 Maintain a range of software as part of a computer system.

The first outcome comprises the theoretical aspects of computer software and provides the opportunity for your knowledge skills to be assessed using a variety of methods, for example, multiple-choice tests.

Outcomes 2 and 3 will be assessed using practical means, for example, installing a range of software from a given brief/task where you will have the opportunity to develop skills and hands-on experience using a variety of different types of software.

Depending on the context of the brief/task, you will also have the opportunity to develop enterprise and employability skills along with citizenship skills.

No prior experience is needed for this unit; however, it would be beneficial if you had general IT and basic digital literacy skills as well as awareness of computer hardware and software, networks, and the Internet.

On completion of this unit, you may progress to networking, computing and IT based subjects at SCQF level 6 and above. This unit also serves as an entry point into vendor-based qualifications such as Cisco Networking Essentials and CompTIA qualifications such as A+ and Network+.

This unit provides opportunities to develop the Core Skills of *Problem Solving* and *Information and Communication Technology* at SCQF level 5.

The Critical Thinking component of Problem Solving and Accessing Information component of Information and Communication Technology at SCQF level 5 are embedded in this unit. When a learner achieves these units, their Core Skills profile will also be updated to include these components