National Unit specification

General information

Unit title: Computing: Computer Hardware and Systems
(SCQF level 4)

Unit code: F1K2 10

Superclass:	CA
Publication date:	January 2014
Source:	Scottish Qualifications Authority
Version:	02

Unit purpose

This Unit is designed to introduce learners to the basic concepts of computer structure. Learners will learn how to install a piece of hardware and a software package onto a computer system. Learners will also develop an understanding of operating systems and different types of peripherals. Learners will learn about safety procedures necessary when installing computer hardware. As the Unit introduces learners to the basic hardware and software concepts of a computer system, it is a suitable foundation Unit for a wide range of computing based qualifications.

Outcomes

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

1   Identify the components of a computer system.
2   Identify safety procedures.
3   Install a hardware component in a computer system.
4   Install a software package on a computer system.

Credit points and level

1 National Unit credit at SCQF level 4: (6 SCQF credit points at SCQF level 4)

Recommended entry to the Unit

Entry is at the discretion of the centre. However, it would be advantageous if learners possessed basic IT skills.

National Unit specification: General information (cont)

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Core Skills

Opportunities to develop aspects of Core Skills are highlighted in the Support Notes for this Unit specification.

There is no automatic certification of Core Skills or Core Skill components in this Unit.

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 Certificate in Computing with Digital Media** Group Award at SCQF level 4.

The Assessment Support Pack (ASP) for this Unit provides assessment and marking guidelines that exemplify the national standard for achievement. It is a valid, reliable and practicable assessment. Centres wishing to develop their own assessments should refer to the ASP to ensure a comparable standard. A list of existing ASPs is available to download from SQA's website **(http://www.sqa.org.uk/sqa/46233.2769.html)**.

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

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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 the components of a computer system.

Performance Criteria

(a) Identify the main components of a computer system.
(b) Identify the inputs and outputs of a computer system.
(c) Identify the backing storage of a computer system.

Outcome 2

Identify safety procedures.

Performance Criteria

(a) Identify correct safety procedures for installing hardware.
(b) Assess safety of a work area.

Outcome 3

Install a hardware component in a computer system.

Performance Criteria

(a) Install successfully a hardware component with limited assistance.
(b) Conform to safety procedures.

Outcome 4

Install a software package on a computer system.

Performance Criteria

(a) Install successfully a software package with limited assistance.
(b) Conform to safety procedures.

National Unit specification: Statement of standards (cont)

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Evidence Requirements for this Unit

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.

Evidence is required to demonstrate that learners have achieved all Outcomes and Performance Criteria. However, sampling may be used in certain circumstances where the sample is sufficiently random and robust to clearly infer competence in the complete domain. Evidence should be gathered in closed book conditions. The evidence for this Unit may be written, oral, performance based, product or a mix of these. Evidence may be stored in a range of media. Evidence may be captured, stored and presented in a range of media (including audio and video) and formats (analogue and digital). Particular consideration should be given to digital formats and the use of multimedia.

Evidence of cognitive competence may be sampled across the knowledge domain defined by this Unit specification, so long as the sample is unknown to the user.

Where evidence of the learner identifying safety procedure is generated without supervision some means of authentication must be carried out (such as oral questioning, source review).

Given the level of this Unit, the amount of evidence, and corresponding time spent on assessment, should be minimised but sufficient to satisfy the performance criteria.

Whenever possible, evidence should be a naturally occurring by-product of teaching and learning. However, it must be produced by the learner without assistance. Authentication must be used where this is uncertain.

Outcomes 1 and 2

Learners can identify the main components of a computer system which include the processor, RAM and ROM. Input and output devices which include keyboard, mouse, microphone, monitor, speakers and printer. The backing storage available including USB flash drive, portable hard disk drive and solid state drive.

Outcomes 3 and 4

Evidence confirming the successful installation of the hardware component and software package.

National Unit Support Notes

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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 purpose of this Unit is to provide foundation knowledge and basic skills of the functional elements of a computer system.

Outcome 1:   A key objective of this Unit is to ensure the learner is aware of and can identify the main components of a computer system which include the processor, RAM and ROM. Input and output devices which include keyboard, mouse, microphone, monitor, speakers and printer. The backing storage available including USB flash drive, portable hard disk drive and solid state drive.

Outcome 2:   Although the emphasis for this Unit is the aforementioned it is important that learners work in a safe and responsible manner for the practical tasks in Outcome 3 and 4. The main safety procedures expected from learners when installing hardware relate to:

- Electric shock — always disconnect completely from mains
- Sharp edges — beware of sharp edges inside PC Cases and small solder pins on boards.
- Connections — use firm, even pressure when making connection but never excessive force
- Handling — handle peripherals with care as they are delicate
- Cleaning — never try to clean any part of your system with any liquid detergents or cloth
- Anti-static strap — must use when touching components inside the PC case

    The main safety procedures learners should be aware of when assessing a safe work area relate to the Health and Safety Regulations Act.

Outcome 3:   An important aim of the Unit is to provide the learner with hands-on experience of working with a computer system and this outcome allows this by installing a hardware component in to a computer system. This component is at the discretion of the centre but should be a component found inside the PC Case such as a graphics card, RAM (Random Access Memory) Chip, NIC (Network Interface Card).

National Unit Support Notes (cont)

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Outcome 4:   This Outcome will give learners hands on experience of installing a software package on to a computer system. This package is at the discretion of the centre and includes Operating Systems, Utility Programs or Applications.

Outcome	Level 4 Content	Level 5 Content	Level 6 Content
Knowledge and understanding of: - **System hardware components** - **Peripheral devices** - **Software**	**Main System Components** CPU RAM (Random Access Memory) ROM (Read Only Memory **Peripherals** **Input** devices: keyboard, mouse, microphone **Output** devices: monitor, printer, speakers **Backing storage:** USB Flash Drive, Portable HD, SSD (Solid State Drive). **Current operating systems**	**Main Physical Components** CPU, main memory, backing storage and input/output elements Information flow between components Structure + main function of the CPU Current memory types Current options for backing up data **Operating Systems** Main functional elements in an operating system including the role of different user interfaces (CLI, GUI) Comparison of operating systems (Windows, Mac, and Linux) Data transfer techniques **Applications** Comparison of application and systems software. Application software types and functions Utility software, including: disk clean-up, anti-virus/malware, disk formatting and back-up techniques	**Motherboard components** Disk Controllers Expansion Slots Integrated Audio Integrated Graphics RAM slots. **Functions of system buses** PCI PCI-X SATA USB **Functions of networking components** Ethernet Cable MAC Address Network Hub Network Interface Controller Network Router, **Functions of operating system components** Device Drivers Disk and File Management Memory Management Networking
Health and safety	**Safety Procedures** Electric shock Sharp Edges Connections Handling Cleaning Ant-Static Strap (Relate to Health & Safety regulations?)	Health and safety when installing computer hardware components Dangers associated with handling/lifting computer hardware components Safe cabling practices Fire hazards and precautions Electrical hazards and prevention methods such as electrostatic discharge (ESD)	Practical task must be carried out with due regard to health and safety procedures
Legal compliance		Ensuring that all software used is correctly licenced	Ensuring that all software is appropriately licensed
Install hardware	Install **one** (internal) hardware component, from: - Expansion card - Memory - Drive	Install a minimum of **two** main physical components in a computer system from: - motherboard - memory module - additional storage - component cards Install **one** peripheral device	**Install a Network Interface Card** - configure the operating system to allow connection to an existing network. - configure to allow the management of shared services including file and printer management.
Install software	Install **one software package**, from: - OS - System utility - Application	Install **one each** of package types: - OS - Utility - Application	**Install, configure and test an operating system**, User Accounts Folder Options Start Menu Browser Security Settings File Sharing Device Driver **Install and test a driver** - for a storage device - a non-storage peripheral
Troubleshooting		Diagnose upto **two** faults	Diagnose operational problems.

National Unit Support Notes (cont)

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Guidance on approaches to delivery of this Unit

The actual distribution of time between Outcomes is at the discretion of the centre. However, one possible approach is to distribute the available time as follows:

Outcome 1:   10 hours
Outcome 2:   10 hours
Outcome 3:   10 hours
Outcome 4:   10 hours

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.

Evidence of practical abilities could be acquired from the completion of an unknown brief set by the centre covering the installation of a hardware component and software package.

The assessment of the learner's ability to identify the components of a computer system could be written or oral responses to a multiple choice test consisting of 20 questions.

The assessment of the learner's ability to identify safety procedures could be written or oral responses to a multiple choice test consisting of 20 questions.

Whenever possible, evidence should be a naturally occurring by-product of teaching and learning. However, it must be produced by the learner without assistance. Authentication must be used where this is uncertain.

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.

National Unit Support Notes (cont)

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Opportunities for developing Core and other essential skills

No opportunities have been identified for developing Core and other essential skills.

History of changes to Unit

Version	Description of change	Date
02	Updated to reflect changes in technology; streamline Outcome statements and Evidence Requirements in line with current guidelines. Additional content grid inserted.	08/01/2014

General information for learners

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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 is an introduction to main hardware and software components of a computer system.

The Unit covers practical skills of installing a hardware component and software package on to a computer system. You will also learn about basic safety precautions you must adhere to when carrying out these tasks.

The assessment of this Unit may take different forms. You may, for example, sit a short test and carry out some practical tasks. The assessment will be straightforward and will not take much time.