National Unit Specification: general information

UNIT Computing: Troubleshoot and Secure IT Systems (SCQF level 5)

CODE F1KD 11

SUMMARY

This Unit is designed to enable candidates to develop the skills required to solve IT hardware and software errors/problems. To help protect hardware, software and the data within an IT system against theft, malfunction and unauthorised access.

This Unit is suitable for a wide range of candidates with an interest in computing.

OUTCOMES

1 Identify errors, threats and solutions when troubleshooting and securing IT systems.
2 Resolve errors by troubleshooting and securing contemporary hardware and software.

RECOMMENDED ENTRY

While entry is at the discretion of the centre, it would be beneficial if candidates possessed basic IT skills. This may be evidenced by possession of:

D01D 10 *Information Technology (Intermediate 1)*

or equivalent qualifications or experience.

CREDIT VALUE

1 credit at Intermediate 2 (6 SCQF credit points at SCQF level 5*)

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

Administrative Information

Superclass: CA

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Version: 01

National Unit Specification: general information (cont)

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CORE SKILLS

While there is no automatic certification of Core Skills in Unit there may be opportunities for developing aspects of Core Skills.

National Unit Specification: statement of standards

UNIT Computing: Troubleshoot and Secure IT Systems (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 the Scottish Qualifications Authority.

OUTCOME 1

Identify errors, threats and solutions when troubleshooting and securing IT systems.

Performance Criteria

(a) Identify errors relating to hardware and software.
(b) Identify security threats to system hardware and software.
(c) Identify solutions for resolving message errors.
(d) Identify solutions to security threats.

OUTCOME 2

Resolve errors by troubleshooting and securing contemporary hardware and software.

Performance Criteria

(a) Resolve errors related to hardware devices.
(b) Resolve errors related to software applications.
(c) Apply and maintain system security effectively.

EVIDENCE REQUIREMENTS FOR THIS UNIT

Evidence is required to demonstrate that candidates meet the requirements of all Outcomes and Performance Criteria.

Written and/or oral recorded evidence is required which demonstrates that the candidate has achieved the requirements of all of the Outcomes and Performance Criteria to show that the candidate has appropriate knowledge and understanding of the content of this Unit.

Candidates are encouraged to use the Internet in any research etc, however, the evidence produced must be the candidate's own work. Assessors should assure themselves of the authenticity of candidate evidence.

Evidence will be in the form of written and/or oral responses to questions for Outcome 1 and performance evidence for Outcome 2.

National Unit Specification: statement of standards (cont)

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For Outcome 1 written and/or oral recorded evidence is required which demonstrates that the candidate has achieved the standard specified in the Outcome and Performance Criteria. The assessment will be supervised, controlled and under closed-book conditions and should last no more than 45 minutes. The instrument of assessment will provide opportunities for the Outcome to be fulfilled by means of sampling across the range of the content of Outcome 1. Where re-assessment is required it should contain a different sample from the range of mandatory content. Achievement can be decided by use of a cut-off score. Each sample must include the following:

- **Three** common problem errors
- **Two** sources of help for common hardware errors
- **Two** sources of help for common software errors
- **Three** resources to correct errors
- **Two** methods to protect **each** of the following: hardware, software and data
- **Two** solutions for resolving specified message errors
- **Two** solutions to specified security threats

The performance evidence for Outcome 2 will consist of an activity log of the candidate's work and an assessor observation checklist. The activity log will provide a record of candidate activity during this Unit which will provide evidence that the candidate has satisfied the Performance Criteria for Outcome 2. Candidate activity must satisfy the prescribed Performance Criteria and must therefore embrace a sufficient range of activities to permit the candidate to satisfy these criteria.

The Candidate's activity log entries will contain:

- Description of problem/task as presented
- Steps taken to identify an appropriate solution
- How the appropriate solution was implemented

The assessor observation checklist is required to record candidate performance to:

- Resolve at least **two** errors related to hardware devices
- Resolve at least **two** errors related to software applications
- Protect hardware, software and data (at least one item must be covered for hardware, software and data)

This activity log will provide a record of candidate activity during this Unit and also provide evidence that the candidate has satisfied all the Performance Criteria for Outcome 2 with due regard to health and safety. An assessor must endorse each candidate activity log together with the candidate with each of their names, signatures and the relevant date(s).

The assessor observation checklist will be used to record that all the tasks have been undertaken correctly by the candidate. An assessor must endorse each checklist with the candidate's name, their name, signature and date.

The Assessment Support Pack (ASP) for this Unit provides sample assessment materials including assessor checklists, practical tasks and an instrument of assessment for the knowledge. Centres wishing to develop their own assessments should refer to the Assessment Support Pack to ensure a comparable standard.

National Unit Specification: support notes

UNIT Computing: Troubleshoot and Secure IT Systems (SCQF level 5)

This part of the Unit Specification is offered as guidance. The support notes 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 enable candidates to develop the skills required to solve IT hardware and software errors/problems. The Unit will also provide candidates with information about how to protect hardware, software, and the data within an IT system against theft, malfunction and unauthorised access which need to be taken account of when using computers.

The current context for this Unit is the on-going demand for computer support personnel as organisations adopt and integrate new and increasingly complex technologies. An important outcome of this Unit is to provide candidates with the confidence that they can solve hardware and software errors.

This Unit should ideally be delivered over an extended period of time to give candidates the opportunity to troubleshoot a range of hardware and software errors/problems.

The precise content of this Unit will change over time as computing technology develops and new devices are introduced.

Outcome 1

This Outcome relates to the knowledge and understanding of troubleshooting and securing IT systems.

Correctly identifying errors associated with hardware and software

Candidates should be aware of:

- the causes of errors and problems
- what are common errors
- how to get information about the hardware
- operating system and software being used that will help in solving errors
- and should be able to identify examples from all of these categories.

Correctly identifying threats to system hardware and software

Candidates should be aware that threats to system hardware and software include viruses, loss of data, information theft, and unauthorised access to hardware or software and should be able to identify examples from all of these categories.

National Unit Specification: support notes

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Correctly identifying solutions for resolving message errors

Candidates should be aware of:

- **when** and **where** to seek advice on technical errors and problems
- **where** and **how** to find advice on common errors with most hardware and software
- ensuring solutions to errors and problems are documented
- and should be able to identify examples from all of these categories.

Correctly identifying solutions to security threats

Candidates should:

- Use anti-virus software to protect hardware and software
- Back-up data following recommended guidelines
- Control access to hardware and software
- Should be able to identify examples from all of these categories.

Outcome 2

This Outcome relates to practical skills in the context of troubleshooting and securing contemporary hardware and software.

Resolve errors related to hardware devices

This Performance Criteria is dealing with errors associated with hardware devices. This includes devices such as keyboard, mouse, printer and networking equipment.

Candidates should be able to resolve common errors and problems by accessing appropriate resources to help resolve these problems. It is not possible for one individual to know every fault that can occur on a computer system, it is generally accepted that manufacturers' books and resources such as forums on the Internet can form part of the troubleshooting process. Candidates should be made aware of this and how this is accepted in industry.

This includes defining the fault accurately using troubleshooting techniques and a methodical approach, relevant to the individual device, ie:

- Test one factor at a time
- List possible causes in order of the most likely to the least likely
- List possible solutions
- Draw diagrams (if necessary).

The importance of documentation when troubleshooting should be stressed to candidates. Documentation may range from eliciting initial fault report from customer, through completion of a fault report sheet to completing a summary of the fault and its solution. This is so that it may form part of a resource database of faults that may be accessed.

National Unit Specification: support notes

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Resolving errors associated with software applications

The comments made above, in Outcome 2 of PC (a), also apply here.

This includes defining the fault accurately using troubleshooting techniques and a methodical approach, relevant to the software application, ie

- Test one factor at a time
- List possible causes in order of the most likely to the least likely
- List possible solutions
- Draw diagrams (if necessary).

The importance of documentation when troubleshooting should be stressed to candidates. Documentation may range from eliciting initial fault report from the user, through completion of a fault report sheet to completing a summary of the fault and its solution. This is so that it may form part of a resource database of faults that may be tapped into when similar situations may occur.

Apply and maintain system security effectively

Candidates should be able to protect hardware, software and data by taking appropriate action including:

- installation of anti-virus software
- download security updates
- back-up of data
- apply password protection to appropriate files.

In addition to this, candidates should be aware of common maintenance tools that are used in order to keep a computer system in good working order.

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

Outcomes 1 and 2 should be taught and delivered in an integrated way rather than sequentially. For Outcome 2, the practical activities should be taught and used to illustrate and exemplify the knowledge and understanding required for Outcome 1.

The amount of time spent on each task will vary depending on the teaching methodology used and the ability and prior experience of the candidate. The actual distribution of time is at the discretion of the centre.

National Unit Specification: support notes (cont)

UNIT Computing: Troubleshoot and Secure IT Systems (SCQF level 5)

Throughout this Unit, candidate activities should relate to their personal or vocational interests. For example, candidates could visit the IT department of a local business to see computer support personnel at work and learn about techniques and systems that they use, to help stimulate their interest. Teaching should be exemplified in terms of services and technologies that the candidates can relate and are likely to use at home, possibly by identifying and resolving errors on their own computer.

This Unit may be delivered on its own or in conjunction with other Units. Where delivery is alongside other Units, there may be an opportunity to contextualise the content across the Units in the grouping.

OPPORTUNITIES FOR CORE SKILL DEVELOPMENT

In this Unit candidates are required to carry out an investigation which may provide an opportunity to gather evidence towards aspects of IT Core Skill.

Candidates are required to carry out an evaluation of computer systems which may provide an opportunity to gather evidence towards aspects of Problems Solving Core Skill.

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

It may be appropriate for some of the evidence for this Unit to be produced using e-assessment. This may take the form of e-testing (for knowledge and understanding) and/or e-portfolios (for practical abilities). Centers using e-assessment must ensure the normal standards for validity and reliability are observed.

If a centre is presenting Outcome 1 of these assessments on-line the following assessment methods, where appropriate, may be selected:

Multiple choice
Drag and drop
Multiple response
Mix and match
Or a combination of the above

It is expected that the questions will be of the multiple-choice variety. Centres may consider the use of alternative questions types, particularly if using Computer Assisted Assessment approaches. However, care should be taken that the questions are valid and at an appropriate level. The use of simple true/false question responses is unlikely to achieve this and should not be used.

Written and/or recorded oral evidence is required which demonstrates that the candidate has achieved Outcome 1. The evidence for this Outcome should be obtained under controlled, supervised conditions. The assessment will be closed-book. It is strongly recommended that an appropriate cut-off score is used to measure achievement. Candidates should normally be expected to complete this assessment within 45 minutes.

Where re-assessment of knowledge and understanding is required the questions presented to the candidate must be different on each assessment occasion.

National Unit Specification: support notes

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The assessment for Outcome 2 should consist of a series of practical tasks. The tasks will involve the observation of the candidate over an extended period of time during which the candidate is required to maintain an activity log. It is recommended that this assessment is started at the earliest opportunity, as soon as the candidate has acquired the necessary knowledge and skills to permit him/her to commence appropriate tasks.

The performance evidence for Outcome 2 will consist of a candidate activity log. This activity log will provide a record of candidate activity during this Unit and also provide evidence that the candidate has satisfied all the Performance Criteria for Outcome 2.

This activity log will provide a record of candidate activity during this Unit and also provide evidence that the candidate has satisfied all the Performance Criteria for Outcome 2 with due regard to health and safety. An assessor must endorse each candidate activity log together with the candidate with each of their names, signatures and the relevant date(s).

The assessor observation checklist will be used to record that all the tasks have been undertaken correctly by the candidate. An assessor must endorse each checklist with the candidate's name, their name, signature and date.

The Assessment Support Pack (ASP) for this Unit provides sample assessment material. Centres wishing to develop their own assessments should refer to the Assessment Support Pack to ensure a comparable standard. A centre may wish to submit their own assessment materials to the SQA Quality Assurance for prior verification.

CANDIDATES WITH DISABILITIES AND/OR ADDITIONAL SUPPORT NEEDS

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering alternative Outcomes for Units. Further advice can be found in the SQA document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs* **(www.sqa.org.uk)**.