National Unit specification: general information

Unit title: Computing: Systems Monitoring and Operation (SCQF level 6)

Unit code: FW05 12

Superclass: CB

Publication date: September 2011

Source: Scottish Qualifications Authority

Version: 01

Summary

The purpose of this Unit is to provide candidates with the key skills required to operate, maintain and monitor ICT systems effectively. Candidates will acquire the practical skills needed to identify external and operation faults, identify inadequate ICT system performance, and implement an appropriate backup procedure. This Unit will also instil the need for accurately documenting all tasks carried out on a particular ICT system. The content of this Unit includes completing an array of operational system checks and preventative maintenance, utilising operating system utilities to log various system parameters, and using automated backup software to create automated scheduled backups.

This is a mandatory Unit in the NC Computing: Technical Support (SCQF level 6). It is also available as a freestanding Unit.

This Unit is suitable for a wide range of candidates and it is particularly appropriate for those who are interested in a career in technical support or a similar area.

Outcomes

1 Operate and maintain common ICT systems and peripheral devices.
2 Monitor the operation and performance of common ICT systems.
3 Produce and implement an effective file backup and restoration strategy.

Recommended entry

While entry is at the discretion of the centre, it will be beneficial that candidates have attained one of the following, or equivalent:

- *Information and Communication Technology* (F3GC 11)

General information (cont)

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Credit points and level

1 National Unit credit at SCQF level 6 (6 SCQF credit points at SCQF level 6*)

**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.*

Core Skills

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

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

National Unit specification: statement of standards

Unit title: Computing: Systems Monitoring and Operation (SCQF level 6)

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

Operate and maintain common ICT systems and peripheral devices.

Performance Criteria

(a) Perform an external visual inspection of a standalone workstation and its associated peripheral devices.
(b) Perform routine preventative maintenance procedures on ICT systems and peripherals devices.
(c) Create and implement a test strategy that will check the functionality of a standalone workstation and its associated peripheral devices.
(d) Accurately document all operational tests and maintenance procedures completed.

Outcome 2

Monitor the operation and performance of common ICT systems.

Performance Criteria

(a) Use specified operating system utility tool to monitor the operation and performance of a standalone desktop workstation.
(b) Use specified operating system utilities to maintain the efficient running of a computer system.
(c) Accurately document the results of operational and performance related ICT system tests.
(d) Identify common problems resulting from ICT systems failing to meet operational requirements.
(e) Identify measures which could be taken to rectify any ICT operational shortcomings.

Outcome 3

Produce and implement an effective file backup and restoration strategy.

Performance Criteria

(a) Implement a manual backup and restoration procedure of specific data, utilising appropriate media.
(b) Use appropriate backup software to schedule an automated backup of specific data, and then the restoration of this data.
(c) Accurately document the completion of the backup and restoration procedure.
(d) Identify the requirements for, and benefits of a well managed backup procedure.

National Unit specification: statement of standards (cont)

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Evidence Requirements for this Unit

Evidence is required to demonstrate that candidates have achieved all Outcomes and Performance Criteria.

All evidence should be produced in closed-book, supervised controlled conditions. For Outcomes 1, 2 and 3 written and/or oral recorded and performance evidence is required which must include:

Outcome 1

- inspection of a standard desktop workstation — base Unit, monitor, keyboard, mouse and two other peripheral devices. At least one potential external problem should be identified
- performance of routine preventative maintenance on a standard desktop workstation — base Unit, monitor, keyboard, mouse and two other peripheral devices
- creation and implementation of a system test strategy that includes at least six suitable tests that may be completed to ensure a computer system is functioning correctly
- all external checks, preventative maintenance and system tests accurately completed and documented

Outcome 2

- effective use of an operating system utility tool to monitor four separate Performance Criteria over a set period, producing a set of log files
- effective use of four operating system utilities to maintain the efficient operation of a computer system
- accurately documented results of operational and performance testing including printouts of the log files
- identification of five common problems resulting from ICT systems failing to meet operational requirements
- identification of five measures which could be taken to rectify any ICT operational shortcomings

Outcome 3

- implementation of manual backup and restoration of specified data on to appropriate media
- use of appropriate backup software to schedule an automated backup routine that includes as a minimum: time, frequency and files to be backed up and the restoration of this data
- accurate documentation of both the manual and automated backup procedures completed;
- identification of why backup procedures are important, and the benefits that having one will provide an individual/organisation

National Unit specification: support notes

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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 precise content of this Unit will change over time, as computing technology develops and new hardware/software is introduced. The following guidance exemplifies the standards in terms of contemporary hardware/software.

The overall aim of this Unit is to provide candidates with the key skills required to operate, maintain and monitor ICT systems effectively. As well as dealing with the practical procedures required in maintaining and operating an ICT system, candidates should also gain the ability to competently complete the associated documentation that accompanies this type of task.

This Unit should ideally be delivered over an extended period of time to give candidates the opportunity to work with a varied range of computer hardware and software.

This Unit aligns to the following National Occupational Standards (NOS) from e-skillsUK:

- IT User
- Using IT systems
- OSP: Optimise IT systems performance

Outcome 1

This Outcome aims to provide candidates with the necessary skills to physically maintain ICT systems and their associated peripheral devices.

Candidates should be provided with opportunities to visually inspect a range of hardware devices for external visual damage, eg jammed optical drive bays, missing keys on keyboard, damaged interconnects.

Candidates should also gain experience conducting routine preventative maintenance with the aim of providing consistent performance and prolong the lifespan of the hardware.

Where possible manufacturers guidelines should be followed to conduct these tasks, such as cleaning printers, scanners, keyboards and optical mice.

Candidates should be able to select a suitable number of test methods to ensure that an ICT system and its associated peripheral devices are functioning correctly, eg. printer test pages, speaker sound checks.

Where possible, candidates should be able to work with realistic pro forma, which will allow them to document the external checks and preventative measures undertaken during this Outcome.

National Unit specification: support notes (cont)

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Outcome 2

This Outcome aims to give the candidate the skills required to monitor, assess, and maintain ICT system performance.

This should be achieved primarily through the use of native operating system utilities, but candidates should also gain experience using third party software, eg. performance logs, disk checks, benchmarking.

Candidates should be provided with the skills to select and implement procedures using appropriate pieces of utility software to combat common operational and performance issues (defragmentation, disk check, File Cleanup, etc.)

Where possible, candidates should be able to work with realistic pro forma, which allows them to document the procedures undertaken during these maintenance tasks.

Outcome 3

This Outcome relates to the implementation of both manual and automated backup procedures.

As well as using native operating system backup tools, third party applications should also be investigated and evaluated. Candidates should be able to identify any additional functionality/performance over the native operating system utility software.

Scope also exists to investigate the various online options available for backing up data. Candidates should be able to plan an effective backup procedure for a given scenario. This should include deciding upon the regularity of backups, making an appropriate choice of data files for backup, and selecting the most appropriate media type for the task. The opportunity should also be given for candidates to backup and restore files over a significant time span, not simply in the same class time slot.

Candidates should gain experience using pro forma to document backup and restoration procedures. There should also be scope for candidates to restore backup data from procedures which they didn't instigate themselves, by making use of the provided backup media and completed documentation.

National Unit specification: support notes (cont)

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Guidance on learning and teaching approaches for this Unit

A practical hands-on approach to learning should be adopted to engage learners and exemplify key concepts. However, all practical activities should be underpinned with appropriate knowledge before candidates commence these activities.

Candidates should be encouraged to use manufactures handbooks and/or online materials to conduct routine preventative maintenance procedures correctly on ICT systems and peripheral devices.

Where possible tutor generated issues/problems should be used to mimic situations that may arise in the normal day-to-day running of ICT systems.

A range of third party utility programs should be used in conjunction with the native operating system tools to both monitor and maintain the effective running of ICT systems.

Candidates should be encouraged to look to their own experiences, both within an educational environment and their personal lives to identify situations where ICT systems have failed to meet operational requirements. However they should also be made aware of the implications these would have in a professional environment.

Candidates should be given the opportunity to use and evaluate numerous backup applications and media types where possible.

The actual distribution of time between Outcomes is at the discretion of the centre. However, one possible distribution of time is:

Outcome 1 — 15 hours
Outcome 2 — 15 hours
Outcome 3 — 10 hours

This Unit may be delivered standalone or in conjunction with other Units. Where it is delivered alongside others, there is an opportunity to contextualise this Unit. This Unit's contents are generic and may be contextualised in a variety of ways.

Guidance on approaches to assessment for this Unit

An integrative approach could be taken with the three Outcomes being assessed through two instruments of assessment.

The first assessment instrument covers the knowledge and understanding requirements for Outcomes 1, 2, and 3 and should be ideally completed after candidates attempt the practical assessment task. This assessment instrument could consist of a suitable range of content that samples all three of the Outcomes evenly.

National Unit specification: support notes (cont)

Unit title: Computing: Systems Monitoring and Operation (SCQF level 6)

The instrument of assessment could be a series of six extended-response questions, which must cover the following areas:

- the potential benefits of routine preventative maintenance
- common problems arising from ICT systems failing to meet operational requirements
- measures to overcome ICT operational shortcomings
- different types of backup — manual, automated, full, incremental, differential, internet
- the need for an appropriate backup procedure, specific to task
- the need to accurately document any operational or maintenance procedures carried out

The second assessment instrument for Outcomes 1, 2, and 3 could be a practical assessment taking the form of scenario-based project, consisting of observation of the candidate over an extended period of time during which the candidate is required to maintain a log of their work. It is recommended that the project flows in a linear fashion, with the completion of each task logically flowing into the next. The assessor should ensure the candidate has successfully completed each stage of the project before moving on to the next. Where the candidate fails to meet the necessary health and safety standards the task should be halted, and remedial work completed before they are allowed to progress.

It is recommended that the assessment is started as soon as candidates have acquired the necessary knowledge and skills to permit them to commence appropriate tasks.

The candidate log could either be paper based or stored in a digital repository (such as an e-portfolio or web log). The log should be completed by candidates to show that they have undertaken all the tasks.

Candidates will have access to notes and reference work as well as online help for this assessment.

An observation checklist may be used to record that all the tasks have been undertaken correctly.

Assessors must also confirm that all activities have been carried out with due regard to health and safety requirements.

Opportunities for the use of 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 candidate evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. Further advice is available in *SQA Guidelines on Online Assessment for Further Education (AA1641, March 2003), SQA Guidelines on e-assessment for Schools (BD2625, June 2005)*.

National Unit specification: support notes (cont)

Unit title: Computing: Systems Monitoring and Operation (SCQF level 6)

Opportunities for developing Core Skills

In this Unit candidates will develop skills in operating, maintaining and monitoring the effective running of ICT systems.
Candidates will:

- inspect a range of hardware devices for external damage
- conduct routine preventative maintenance to retain maximum performance and prolong the life of the hardware
- select suitable test methods to ensure that ICT systems and associated peripheral devices are functioning correctly
- select and implement procedures using appropriate pieces of utility software to combat common operation and performance issues
- document the external checks and preventative measure undertaken and the procedures undertaken during maintenance tasks
- plan an effective backup procedure
- restore data files

This means that as candidates are doing this Unit they will be developing aspects of the Core Skills of *Problem Solving, Information and Communication Technology* and *Communication.*

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**

History of changes to Unit

Version	Description of change	Date