

Higher National Unit Specification

General information for centres

Unit title: Operating System Concepts

Unit code: DF9L 33

Unit purpose: This Unit is designed to introduce candidates to the issues involved in installing and using PC Operating Systems. It is intended for candidates undertaking an HNC/D in Computing, Computer Networking or a related area who require an understanding of operating systems.

On completion of the Unit candidates should be able to:

1. Describe the characteristics of PC operating systems.
2. Install, configure and upgrade a client operating system.
3. Diagnose and troubleshoot client operating system problems.
4. Describe the networking features of client operating systems.

Credit value: 1 HN credit at SCQF level 6: (8 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.*

Recommended prior knowledge and skills: Access to this Unit will be at the discretion of the Centre. There are no specific requirements but candidates would benefit from knowledge of computer hardware. This may be demonstrated by the possession of relevant SQA National Qualifications in Computing or Information Systems.

Core skills: There may be opportunities to gather evidence towards core skills in this Unit, although there is no automatic certification of core skills or core skills components.

Context for delivery: This Unit is included in the framework of a number of HNC and HND group awards. It is recommended that it should be taught and assessed within the context of the particular group award to which it contributes.

Assessment: Evidence for the knowledge and/or skills for the entire Unit must be produced using a set of 30 restricted-response questions to assess candidates' knowledge and understanding. This may be administered as a single end-of unit test, or as several subtests, each covering one or more outcomes.

General information for centres (cont)

Candidates must answer at least 70% of the questions correctly in order to obtain a pass. If subtests are used, they must also score at least 70% in each subtest.

Testing must take place in a closed-book environment where candidates have no access to books, handouts, notes or other learning material. Testing can be done in either a machine-based or paper-based format and must be invigilated by a tutor or mentor. There must be no communication between candidates and communication with the administrator must be restricted to matters relating to the administration of the test.

If a candidate requires to be reassessed, a different selection of questions must be used. At least half the questions in the reassessment must be different from those used in the original test.

If an outcome has a practical component, this must be assessed by having the candidate use a logbook to record the practical tasks successfully completed. The logbook can be in paper or electronic form and must be authenticated by the tutor or mentor.

For some outcomes only a sample of the practical tasks needs to be completed and recorded for assessment purposes, e.g. three out of five. This is clearly indicated in the logbook instructions for the outcomes involved. Where this occurs, tutors must inform candidates of the tasks to be completed.

An Assessment Exemplar and Guidelines on the Delivery of the Unit have been produced to indicate the national standard of achievement required at SCQF level 6.

Higher National Unit specification: statement of standards

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The sections of the Unit stating the Outcomes, knowledge and/or skills, and evidence requirements are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the knowledge and/or skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Describe the characteristics of PC operating systems.

Knowledge and skills

- ◆ Identify the major operating system components and interfaces and their functions.
- ◆ Identify the names, locations, purposes, and contents of major system files.
- ◆ Use command-line functions and utilities to manage the operating system
- ◆ Identify procedures for creating, viewing, and managing disks, directories and files.

Evidence Requirements

Restricted response test

The knowledge and skills component of Outcome 1 must be examined by eight questions, two being derived from each of the four items listed below. Each question must be derived from a single item.

1. Identify the major operating system components and interfaces and their functions.

OS versions, virtual memory, file systems, user interfaces

2. Identify the names, locations, purposes, and contents of major system files.

As appropriate to specific OS.

3. Use command-line functions and utilities to manage the operating system

Purpose, location, syntax, switches.

Higher National Unit specification: statement of standards (cont)

Unit title: Operating System Concepts

4. Identify procedures for creating, viewing, and managing disks, directories and files.

File attributes, security issues.

The test may be administered on its own as a subtest or be combined with other outcome subtests in the Unit.

Alternatively, the 8 questions for this outcome may contribute towards a single end-of-unit test of 30 questions.

Logbook

The logbook for Outcome 1 must record successful completion by the candidate of **two** of the four tasks listed below. The tasks to be completed must be selected by the tutor.

1. Identify the major operating system components and interfaces and their functions.

Documentary evidence that the candidate can identify the major operating system components and interfaces and their functions, including OS versions, virtual memory, file systems and user interfaces

2. Identify the names, locations, purposes, and contents of major system files.

Documentary evidence that the candidate can identify the names, locations, purposes, and contents of major system files as appropriate to specific OS.

3. Use command-line functions and utilities to manage the operating system

Documentary evidence that the candidate can use command-line functions and utilities to manage the operating system and state their purpose, location, syntax and switches.

4. Identify procedures for creating, viewing, and managing disks, directories and files.

Documentary evidence that the candidate can identify procedures for creating, viewing, and managing disks, directories and files, including setting and changing file attributes.

Assessment guidelines

It is suggested that all the above concepts be presented and explained within the context of current real-world practice and applications.

Higher National Unit specification: statement of standards (cont)

Unit title: Operating System Concepts

The suggested time allocation for a restricted response test is 2 minutes for each question plus 5 minutes starting-up time and 5 minutes finishing-off time, thus a total of 70 minutes should be allocated for a 30-question end-of-unit test.

Although individual outcome tests are permissible, it is suggested that if subtests are to be used, outcomes should be combined to produce tests of no fewer than 10 questions. A 10-question test would therefore have a time allocation of 30 minutes.

Outcome 2

Install, configure and upgrade a client operating system.

Knowledge and skills

1. Identify the procedures for installing and configuring a client OS.
2. Identify the steps required to perform a client OS upgrade.
3. Identify basic system boot sequences and boot methods.
4. Identify procedures for installing or adding a device.
5. Identify procedures for optimising the operating system.

Evidence Requirements

Restricted response test

The knowledge and skills component of Outcome 2 must be examined by ten questions, two being derived from each of the five items listed below. Each question must be derived from a single item.

1. Identify the procedures for installing and configuring a client OS.

Hardware compatibility, installation options and methods, disk preparation, device driver configuration

2. Identify steps required to perform a client operating system upgrade.

Available upgrade paths, hardware and application compatibility, service packs and patches.

3. Identify basic system boot sequences and boot methods.

Boot sequences, alternative boot methods, emergency disks

Higher National Unit specification: statement of standards (cont)

Unit title: Operating System Concepts

4. Identify procedures for installing or adding a device.

Loading, adding and configuring device drivers, required software.

5. Identify procedures for optimising the operating system.

Virtual memory management, disk defragmentation, files and buffers, caches, temporary file management

The test may be administered on its own as a subtest or be combined with other outcome subtests in the Unit.

Alternatively, the 10 questions for this outcome may contribute towards a single end-of-unit test of 30 questions.

Logbook

The logbook for Outcome 2 must record successful completion by the candidate of **three** of the five tasks listed below. The tasks to be completed must be selected by the tutor.

1. Identify the procedures for installing and configuring a client OS.

Documentary evidence that the candidate can install and configure a client OS, taking account of hardware compatibility, installation options and methods, disk preparation and device driver configuration

2. Identify steps required to perform a client operating system upgrade.

Documentary evidence that the candidate can identify the steps required to perform a client operating system upgrade, taking into account the available upgrade paths, hardware and application compatibility and service packs and patches.

3. Identify basic system boot sequences and boot methods.

Documentary evidence that the candidate can identify boot sequences, alternative boot methods, emergency disks

4. Identify procedures for installing or adding a device.

Documentary evidence that the candidate can load, add and configure device drivers and install required software.

Higher National Unit specification: statement of standards (cont)

Unit title: Operating System Concepts

5. Identify procedures for optimising the operating system.

Documentary evidence that the candidate can identify procedures for optimising the operating system, including those relating to virtual memory management, disk defragmentation, files and buffers, caches, temporary file management.

Assessment guidelines

It is suggested that all the above concepts be presented and explained within the context of current real-world practice and applications.

The suggested time allocation for a restricted response test is 2 minutes for each question plus 5 minutes starting-up time and 5 minutes finishing-off time, thus a total of 70 minutes should be allocated for a 30-question end-of-unit test.

Although individual outcome tests are permissible, it is suggested that if subtests are to be used, outcomes should be combined to produce tests of no fewer than 10 questions. A 10-question test would therefore have a time allocation of 30 minutes.

Outcome 3

Diagnose and troubleshoot client operating system problems.

Knowledge and skills

1. Interpret error messages and identify steps to correct problems.
2. Use common diagnostic utilities and tools.
3. Recognise common operational and usability problems and their solutions.

Evidence Requirements

Restricted response test

The knowledge and skills component of Outcome 3 must be examined by six questions, two being derived from each of the three items listed below. Each question must be derived from a single item.

1. Interpret error messages and identify steps to correct problems.

Common error messages and codes, boot failure errors, startup messages, utilities

Higher National Unit specification: statement of standards (cont)

Unit title: Operating System Concepts

2. Use common diagnostic utilities and tools.

Startup disks, startup Modes

3. Recognise common operational and usability problems and their solutions.

The test may be administered on its own as a subtest or be combined with other outcome subtests in the Unit.

Alternatively, the 6 questions for this outcome may contribute towards a single end-of-unit test of 30 questions.

Logbook

The logbook for Outcome 3 must record successful completion by the candidate of **two** of the three tasks listed below. The tasks to be completed must be selected by the tutor.

1. Interpret error messages and identify steps to correct problems.

Documentary evidence that the candidate can interpret error messages and identify steps to correct problems, including common error messages and codes, boot failure errors, startup messages and utilities.

2. Use common diagnostic utilities and tools.

Documentary evidence that the candidate can use common diagnostic utilities and tools including startup disks and startup modes.

3. Recognise common operational and usability problems and their solutions.

Documentary evidence that the candidate can recognise common operational and usability problems and their solutions.

Assessment guidelines

It is suggested that all the above concepts be presented and explained within the context of current real-world practice and applications.

The suggested time allocation for a restricted response test is 2 minutes for each question plus 5 minutes starting-up time and 5 minutes finishing-off time, thus a total of 70 minutes should be allocated for a 30-question end-of-unit test.

Higher National Unit specification: statement of standards (cont)

Unit title: Operating System Concepts

Although individual outcome tests are permissible, it is suggested that if subtests are to be used, outcomes should be combined to produce tests of no fewer than 10 questions. A 10-question test would therefore have a time allocation of 30 minutes.

Outcome 4

Describe the networking features of client operating systems.

Knowledge and skills

- ◆ Configure a client operating system to connect to a network.
- ◆ Configure a client operating system to access Internet resources.

Evidence Requirements

Restricted response test

The knowledge and skills component of Outcome 4 must be examined by six questions, three being derived from each of the two items listed below. Each question must be derived from a single item.

1. Configure a client operating system to connect to a network.

Protocols, client options, configuration tools

2. Configure a client operating system to access Internet resources.

Protocols, connectivity technologies, browsers, firewall protection

The test may be administered on its own as a subtest or be combined with other outcome subtests in the Unit.

Alternatively, the 6 questions for this outcome may contribute towards a single end-of-unit test of 30 questions.

Logbook

The logbook for Outcome 4 must record successful completion by the candidate of **both** of the tasks listed below.

Higher National Unit specification: statement of standards (cont)

Unit title: Operating System Concepts

1. Configure a client operating system to connect to a network.

Documentary evidence that the candidate can configure a client operating system to connect to a network, taking account of protocols, client options and configuration tools.

2. Configure a client operating system to access Internet resources.

Documentary evidence that the candidate can configure a client operating system to access Internet resources, taking account of protocols, connectivity technologies, browsers and firewall protection.

Assessment guidelines

It is suggested that all the above concepts be presented and explained within the context of current real-world practice and applications.

The suggested time allocation for a restricted response test is 2 minutes for each question plus 5 minutes starting-up time and 5 minutes finishing-off time, thus a total of 70 minutes should be allocated for a 30-question end-of-unit test.

Although individual outcome tests are permissible, it is suggested that if subtests are to be used, outcomes should be combined to produce tests of no fewer than 10 questions. A 10-question test would therefore have a time allocation of 30 minutes.

Administrative Information

Unit code:	DF9L 33
Unit title:	Operating System Concepts
Superclass category:	CB
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Higher National Unit specification: support notes

Unit title: Operating Systems Concepts

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.

The suggested time allocation for each outcome (including assessment) is as follows:

Outcome 1:	12 hours
Outcome 2:	10 hours
Outcome 3:	10 hours
Outcome 4:	8 hours

Guidance on the content and context for this Unit

As it is likely that the bulk of the material in this Unit will be delivered through lecturer exposition, it is important that every opportunity is taken to introduce real-world examples, opportunities for whole-class and group discussion and practical demonstrations wherever possible. Concepts and terminology should be presented in context throughout the Unit. Video presentations should be used where appropriate for providing an alternative explanation of a difficult topic, or as a focus for class discussion or groupwork.

Given the theoretical nature of this Unit, it is intended that a significant amount of time will be made available as a central part of the course for revision, tutorials and formative assessment exercises. Candidates should be strongly encouraged to undertake further reading, and opportunities for individual or group research should be provided.

The most important overall emphasis should be on the relevance and currency of content in such a rapidly-evolving field.

This Unit may assist candidates in preparing for CompTIA examination 220-232: A+ OS Technologies. Vendor certifications can change rapidly and candidates should be encouraged to check the current details at www.comptia.org to ensure that all objectives have been covered. This examination can also contribute towards the Microsoft Certified Systems Administrator (MCSA) award.

The mandatory parts of this unit are written in a vendor-independent manner. However, the following Support Notes assume that the unit will be delivered using Microsoft client operating systems, such as Windows 98, Windows ME, Windows 2000 Professional or Windows XP Professional. However, no restriction is placed on the operating system to be used and centres are free to choose alternative operating systems such as Linux/Unix, although this may require significant changes in terminology.

Higher National Unit specification: support notes (cont)

Unit title: Operating Systems Concepts

The content of this unit may be delivered using relevant vendor-supplied materials, such as Cisco IT Essentials 1. As these materials are under continuous development, centres should check carefully to ensure that they meet all the requirements for the unit.

There is a close link between this unit and Unit No: DF9M 34 Client Operating System. The major difference is that this is a Level 6 unit which gives a broad coverage of the features of a range of client operating systems, whereas DF9M 34 Client Operating System is a Level 7 unit which looks at a single client operating system in much greater detail. However, there is significant overlap between the units and substantial savings could be made in both delivery and assessment time by teaching them together.

Outcome 1

This Outcome is about the characteristics of PC operating systems.

1 Identify the major operating system components and interfaces and their functions.

Candidates should be able to identify the major desktop components and interfaces and their functions and differentiate the characteristics of Windows 9x/Me, Windows NT 4.0 Workstation, Windows 2000 Professional, and Windows XP. Content may include the following: contrasts between Windows 9x/Me, Windows NT 4.0 Workstation, Windows 2000 Professional, and Windows XP; major operating system components (Registry, Virtual Memory, File System); major operating system interfaces (Windows Explorer, My Computer, Control Panel, Computer Management Console, Accessories/System Tools, Command line, Network Neighborhood / My Network Places, Task Bar/Systray, Start Menu, Device Manager)

2 Identify the names, locations, purposes, and contents of major system files.

Candidates should be able to identify the names, locations, purposes, and contents of major system files. Content may include the following: Windows 9x –specific files (IO.SYS, MSDOS.SYS, AUTOEXEC.BAT, COMMAND.COM, CONFIG.SYS, HIMEM.SYS, EMM386.EXE, WIN.COM, SYSTEM.INI, WIN.INI, SYSTEM.DAT, USER.DAT); Windows NT / 200x-specific files (BOOT.INI, NTLDR, NTDETECT.COM, NTBOOTDD.SYS, NTUSER.DAT, registry data files).

Higher National Unit specification: support notes (cont)

Unit title: Operating Systems Concepts

3 Use command-line functions and utilities to manage the operating system

Candidates should be able to demonstrate the ability to use command-line functions and utilities to manage the operating system, including their purpose and location and the proper syntax and switches. Command line functions include: Command/CMD, DIR, ATTRIB, VER, MEM, EDIT, XCOPY, COPY, SETVER, MD/CD/RD, DELETE / RENAME, DELTREE, TYPE, ECHO, SET, PING; Utilities include: Disk Management Tools (DEFRAG.EXE, FDISK.EXE, Backup/Restore Utility (MSBackup, NTBackup etc.), SCANDISK, CHKDSK, Disk Cleanup, FORMAT); System Management Tools: (Device Manager, System Monitor, Computer Manager, MSCONFIG.EXE, REGEDIT.EXE, REGEDT32.EXE, SYSEDIT.EXE, SCANREG, Event Viewer, Task Manager); File Management Tools (ATTRIB.EXE, EXTRACT.EXE, EDIT.COM, Windows Explorer).

4 Identify procedures for creating, viewing, and managing disks, directories and files.

Candidates should also be able to identify basic concepts and procedures for creating, viewing, and managing disks, directories and files. This includes procedures for changing file attributes and the ramifications of those changes (for example, security issues). Content may include the following: Disks: Partitions (Active Partition, Primary Partition, Extended Partition, Logical Partition); File Systems: FAT16, FAT32, NTFS4, NTFS5.x; Directory Structures: root directory, subdirectories, creating folders, navigating the directory structure, maximum depth; Files: creating files file naming conventions (most common extensions, 8.3, maximum length), file attributes (Read Only, Hidden, System, and Archive attributes), File Compression, File Encryption, File Permissions, File types (text vs binary file).

Outcome 2

Outcome 2 is about installing, configuring and upgrading a client operating system.

1 Identify the procedures for installing and configuring a client OS.

Candidates should be able to identify the procedures for installing Windows 9x/Me, Windows NT 4.0 Workstation, Windows 2000 Professional, and Windows XP, and bringing the operating system to a basic operational level. Content may include the following: verify hardware compatibility and minimum requirements, determine OS installation options, installation type (typical, custom, other), network configuration, file system type, dual boot support, disk preparation order (conceptual disk preparation),

Higher National Unit specification: support notes (cont)

Unit title: Operating Systems Concepts

starting the installation, partition, format drive, run appropriate set up utility (SETUP, WINNT), Installation methods: bootable CD, boot floppy, network installation, drive imaging; Device Driver Configuration: load default drivers, find updated drivers; restore user data files (if applicable); identify common symptoms and problems.

2 Identify the steps required to perform a client OS upgrade.

Candidates should be able to identify the steps required to perform a client operating system upgrade from Windows 9.x/ME, Windows NT 4.0 Workstation, Windows 2000 Professional and Windows XP, and, given an upgrade scenario, choose the appropriate next steps. Content may include the following: upgrade paths available, determine correct upgrade startup utility (e.g. WINNT32 vs WINNT), verify hardware compatibility and minimum requirements, verify application compatibility, apply OS service packs, patches and updates, install additional Windows components.

3 Identify basic system boot sequences and boot methods.

Candidates should be able to identify the basic system boot sequences and boot methods, including the steps to create an emergency boot disk with utilities installed for Windows 9x/Me, Windows NT 4.0 Workstation, Windows 2000 Professional and Windows XP. Content may include the following: boot sequence, files required to boot, boot steps (9.x, NT/200x/XP), alternative boot methods, using a startup disk, safe/VGA-only mode, last known good configuration, command prompt mode, booting to a system restore point, recovery console, boot.ini switches, dual boot, creating emergency disks with OS utilities, creating emergency repair disk (ERD).

4 Identify procedures for installing or adding a device.

Candidates should be able to identify procedures for installing/adding a device, including loading, adding and configuring device drivers and required software. Content may include the following: device driver installation, plug and play (PNP) and non-PNP devices, install and configure device drivers, install different device drivers, manually install a device driver, search the internet for updated device drivers, using unsigned drivers (driver signing), install additional Windows components, determine if permissions are adequate for performing the task.

5 Identify procedures for optimising the operating system.

Candidates should also be able to identify procedures necessary to optimise the operating system and major operating system subsystems. Content may include the following: virtual memory management, disk defragmentation, files and buffers, caches, temporary file management

Higher National Unit specification: support notes (cont)

Unit title: Operating Systems Concepts

Outcome 3

Outcome 3 is about diagnosing and troubleshooting client operating system problems.

1 Interpret error messages and identify steps to correct problems.

Candidates should be able to recognise and interpret the meaning of common error codes and startup messages from the boot sequence and identify steps to correct the problems. Content may include the following: common error messages and codes, boot failure and errors, invalid boot disk, inaccessible boot device, missing NTLDR, bad or missing command interpreter, startup messages, error in CONFIG.SYS line XX, HIMEM.SYS not loaded, missing or corrupt HIMEM.SYS, Device/Service has failed to start, A device referenced in SYSTEM.INI, WIN.INI, Registry is not found, Event Viewer, event log is full, failure to start GUI, Windows Protection Error, user-modified settings cause improper operation at startup, registry corruption, Using the correct Utilities: Dr. Watson, Boot Disk, Event Viewer.

2 Use common diagnostic utilities and tools.

Candidates should be able to recognize when to use common diagnostic utilities and tools, and, given a diagnostic scenario involving one of these utilities or tools, select the appropriate steps needed to resolve the problem. Utilities and tools may include the following: Startup disks: required files for a boot disk, boot disk with CD-ROM support; Startup Modes: safe mode, safe mode with command prompt, safe mode with networking, step-by-step/single step mode, automatic skip driver (ASD.EXE); Diagnostic tools, utilities and resources: user/installation manuals, internet/web resources, training materials, Task Manager, Dr. Watson, Boot Disk, Event Viewer. Device Manager, WinMSD, MSD, Recovery CD, CONFIGSAFE; eliciting problem symptoms from customers; having customer reproduce error as part of the diagnostic process; identifying recent changes the computer environment from the user

3 Recognise common operational and usability problems and their solutions.

Candidates should also be able to recognise common operational and usability problems and determine how to resolve them. Content may include the following: Troubleshooting Windows-specific printing problems: print spool is stalled, incorrect/incompatible driver for print, incorrect parameter; Other common problems: General Protection Faults, blue screen error (BSOD), illegal operation, invalid working directory, system lock up, option (sound card, modem, input device) will not function, application will not start or load, cannot log on to network (option – NIC not functioning), applications don't install, network connection; viruses and virus types: what they are, TSR (Terminate and Stay

Higher National Unit specification: support notes (cont)

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Resident) programs and virus, sources (floppy, emails, etc.), how to determine presence of viruses.

Outcome 4

This outcome is about configuring a client operating system to connect to a network.

1 Configure a client operating system to connect to a network.

Candidates should be able to identify the networking capabilities of Windows and, given configuration parameters, configure the operating system to connect to a network. Content may include the following: configure protocols, TCP/IP (Gateway, Subnet mask, DNS (and domain suffix), WINS, Static address assignment, Automatic address assignment (APIPA, DHCP)), IPX/SPX (NWLink), AppleTalk, NetBEUI/ NetBIOS; configure Client options: Microsoft, Novell, verify the configuration; Understand the use of the following tools, IPCONFIG.EXE, WINIPCFG.EXE, PING, TRACERT.EXE, NSLOOKUP.EXE, Share resources (understand the capabilities/limitations with each OS version), setting permissions to shared resources; network type and network card

2 Configure a client operating system to access Internet resources.

Candidates should also be able to identify the basic Internet protocols and terminologies and identify procedures for establishing internet connectivity. In a given scenario, they should be able to configure the operating system to connect to and use Internet resources. Content may include the following: Protocols and Terminologies: ISP, TCP/IP, E-mail (POP, SMTP, IMAP), HTML, HTTP, HTTPS, SSL, Telnet, FTP, DNS; Connectivity technologies, Dial-up networking, DSL networking, ISDN networking, Cable, Satellite, Wireless, LAN; Installing and Configuring browsers: enable/disable script support, configure proxy settings, configure security settings; firewall protection (under Windows XP).

Guidance on the delivery and assessment of this unit

This Unit is likely to form part of a group award which is primarily designed to provide candidates with technical or professional knowledge and skills related to a specific occupational area. It is highly technical in content and should not be adopted by group awards in other areas or delivered as a stand-alone Unit without careful consideration of its appropriateness. It is a Unit which candidates are likely to find accessible at an introductory level; it is suggested that it be delivered part of an HNC or first-year HND program in Computing or a related area, giving candidates experience of basic background topics involved in the hardware and software aspects of computer networks

Higher National Unit specification: support notes (cont)

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To minimise assessment overhead, one or more sets of closed-book restricted-response questions, totalling 30 questions in all, should be used to provide evidence of candidates' knowledge for all Outcomes. It is suggested that multiple-choice questions should be used as the preferred assessment method – as well as reducing the time required for assessment and marking, these reduce the need for candidates to memorise details and encourage understanding. 70% of the questions must be answered correctly. Candidates must also complete a logbook recording the practical work undertaken for each outcome.

Open learning

If this Unit is delivered by open or distance learning methods, additional planning and resources may be required for candidate support, assessment and quality assurance.

A combination of new and traditional authentication tools may have to be devised for assessment and re-assessment purposes.

For further information and advice, please see *Assessment and Quality Assurance for Open and Distance Learning* (SQA, February 2001 — publication code A1030).

Special needs

This Unit specification is intended to ensure that there are no artificial barriers to learning or assessment. Special needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering special alternative Outcomes for Units. For information on these, please refer to the SQA document *Guidance on Special Assessment Arrangements* (SQA, 2001).

General information for candidates

Unit title: Operating System Concepts

This is a 1-credit Unit at Level 6 intended for candidates undertaking a Computing or IT-related qualification who require an understanding of PC operating systems. It is designed to develop an understanding of the issues involved in installing and maintaining. On completion of the Unit you should be able to:

- Describe the characteristics of PC operating systems.
- Install, configure and upgrade a client operating system.
- Diagnose and troubleshoot client operating system problems.
- Describe the networking features of client operating systems.

In the first part of the course, you will study the characteristics of PC operating systems including operating system components and interfaces, major system files, command-line functions and utilities and disks, directories and files.

The second section covers installing, configuring and upgrading a client operating system including system boot sequences and boot methods, installing and adding devices and optimising a client operating system.

The third section covers diagnosing and troubleshooting client operating system problems, including error messages, diagnostic tools and utilities and operational and usability problems

The final section covers the networking features of client operating systems including connecting to a network and configuring an Internet connection

There will be a closed-book multiple-choice assessment covering all outcomes. You will be presented with 30 questions and expected to answer 70% of these correctly. You will also be expected to keep a log book recording the practical tasks you have carried out during the Unit.

This Unit may assist you in preparing for CompTIA examination 220-232: A+ OS Technologies. Vendor certifications can change rapidly, so you should check the current details at www.comptia.org to ensure that all objectives have been covered. This examination can also contribute towards the Microsoft Certified Systems Administrator (MCSA) award.