



## Higher National Unit specification: general information

**Unit title:** Computing: PC Hardware and Operating Systems Essentials

**Unit code:** H17E 34

**Superclass:** CA

**Publication date:** March 2012

**Source:** Scottish Qualifications Authority

**Version:** 01

### Unit purpose

This Unit is designed to develop basic competencies necessary for an entry level IT Professional working as a field, service or PC technician, upgrading, configuring, troubleshooting and performing preventative maintenance on PC hardware and operating systems. It is intended for candidates undertaking an HNC/HND Computing, Computer Networking or a related area which requires an understanding of computer hardware and operating systems.

On completion of the Unit the candidate should be able to:

- 1 Describe PC and laptop fundamentals.
- 2 Identify troubleshooting, repair and maintenance methods.
- 3 Identify operating systems and software features.
- 4 Describe networking and security.
- 5 Describe operational procedures in PC support.

### Recommended prior knowledge and skills

Access to this Unit will be at the discretion of the centre. Candidates may study this Unit in tandem with HN Unit *Computing: PC Hardware and Operating Systems Support*.

### Credit points and level

1 Higher National Unit credit at SCQF level 7: (8 SCQF credit points at SCQF level 7\*)

*\*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.*

## **General information (cont)**

### **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.

### **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.

## Higher National Unit specification: statement of standards

**Unit title:** Computing: PC Hardware and Operating Systems Essentials

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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 PC and laptop fundamentals.

#### Knowledge and/or Skills

- ◆ Storage Devices and backup media
- ◆ Motherboards
- ◆ Power Supplies
- ◆ CPUs and memory
- ◆ Display
- ◆ Peripherals and adaptor cards
- ◆ Laptops
- ◆ Printers

#### Evidence Requirements

The Knowledge and Skills component for Outcome 1 must be examined by eight multiple-choice/response questions, one derived from each bullet point.

The test may be administered on its own, as a subtest, or be combined with other Outcome subtests in the Unit. Alternatively, the eight questions for this Outcome may contribute towards a single end-of-Unit test of 36 questions.

#### Logbook

A logbook for Outcome 1 must record successful completion by the candidate of all topics listed above.

Assessors should ensure themselves of the authenticity of the candidate's evidence.

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:** Computing: PC Hardware and Operating Systems Essentials

### Outcome 2

Identify troubleshooting, repair and maintenance methods.

#### Knowledge and/or Skills

- ◆ Hardware and operating system troubleshooting
- ◆ Printer troubleshooting
- ◆ Laptop troubleshooting
- ◆ Preventative maintenance techniques

#### Evidence Requirements

The Knowledge and Skills component for Outcome 2 must be examined by eight multiple-choice/response questions, two each being derived from each bullet point.

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

Alternatively, the eight questions for this Outcome may contribute towards a single end-of-Unit test of 36 questions.

#### Logbook

A logbook for Outcome 2 must record successful completion by the candidate of all tasks listed above.

Assessors should ensure themselves of the authenticity of the candidate's evidence.

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:** Computing: PC Hardware and Operating Systems Essentials

### Outcome 3

Identify operating systems and software features.

#### Knowledge and/or Skills

- ◆ Operating Systems Features
- ◆ User interfaces
- ◆ Operating system installation
- ◆ Boot sequences and startup utilities

#### Evidence Requirements

The Knowledge and Skills component for Outcome 3 must be examined by eight multiple-choice/response questions, two each being derived from each bullet point.

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

Alternatively, the eight questions for this Outcome may contribute towards a single end-of-Unit test of 36 questions.

#### Logbook

A logbook for Outcome 3 must record successful completion by the candidate of all tasks listed above.

Assessors should ensure themselves of the authenticity of the candidate's evidence.

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:** Computing: PC Hardware and Operating Systems Essentials

### Outcome 4

Describe networking and security.

#### Knowledge and/or Skills

- ◆ Networks
- ◆ Security

#### Evidence Requirements

The Knowledge and Skills component of Outcome 3 must be examined by eight questions, four being derived from each bullet point.

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

Alternatively, the eight questions for this Outcome may contribute towards a single end-of-Unit test of 36 questions.

#### Logbook

A logbook for Outcome 4 must record successful completion by the candidate of all tasks listed above.

Assessors should ensure themselves of the authenticity of the candidate's evidence.

All the above concepts be presented and explained within the context of current real-world practice and applications.

### Outcome 5

Describe operating procedures in PC support.

#### Knowledge and/or Skills

- ◆ Safety and Environmental Issues
- ◆ Communication and Professionalism

#### Evidence Requirements

The Knowledge and Skills component of Outcome 4 must be examined by four questions, two being derived from each bullet point.

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

## **Higher National Unit specification: statement of standards (cont)**

**Unit title:** Computing: PC Hardware and Operating Systems Essentials

Alternatively, the four questions for this Outcome may contribute towards a single end-of-Unit test of 36 questions.

### **Logbook**

A logbook for Outcome 5 must record successful completion by the candidate of all tasks listed above.

Assessors should ensure themselves of the authenticity of the candidate's evidence.

All the above concepts be presented and explained within the context of current real-world practice and applications.

## Higher National Unit specification: support notes

**Unit title:** Computing: PC Hardware and Operating Systems Essentials

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

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 group work.

The most important overall emphasis should be on the relevance and currency of content in such a rapidly-evolving field and providing practical skills essential to an entry level IT professional.

This Unit may assist candidates in preparing for CompTIA Examination A+ 220–701 2009 Exam Objectives. Vendor certifications can change rapidly and candidates should be encouraged to check the current details at [www.comptia.org](http://www.comptia.org) to ensure that all objectives have been covered. Where candidates produce evidence of a current A+ certification 2009 objective or A+ 2006 objectives, credit transfer may be offered for underlying theory and knowledge only.

The following mapping exists between Outcomes of this Unit, and the exam objectives of CompTIA (2009) 220-701:

Outcome 1	Domain 1.0 (Hardware) <b>and</b>
Outcome 2	Domain 2.0 (Troubleshooting, Repair and Maintenance)
Outcome 3	Domain 3.0 (Operating System and Software)
Outcome 4	Domain 4.0 (Networking) and Domain 5.0 (Security)
Outcome 5	Domain 6.0 (Operational Procedure)

#### Outcome 1 covers:

**Storage Devices and backup media** — Disks, Optical media, removable storage.

**Motherboard Components, types and features** — Form factors, Interfaces, Slots, BIOS,

**Power supplies** — Types and features, voltage

**CPUs and memory** — CPU types, speeds, cache, 32 and 64 bit architectures. Memory types and speeds.

**Display** — CRT, LCD, Projectors. Connections. Settings.



## Higher National Unit specification: support notes (cont)

**Unit title:** Computing: PC Hardware and Operating Systems Essentials

**Peripherals and adaptor cards** — Input and Output devices. Adapter card types and functions.

**Laptops** — Power and communication connections, expansion cards, Input devices

**Printers** — Types, local and network printers. Drivers. Consumables.

**Outcome 2 covers:**

**Hardware and operating system troubleshooting** — Startup errors and symptoms. Printing problems. Application Installation problems

**Troubleshooting methods and tools for printers** — Print management. Printer properties. Print Spoolers.

**Troubleshooting laptops** — Issue identification. Basic troubleshooting methods

**Preventative maintenance techniques** — Physical inspections. Software and security updates. Scheduling tasks, eg defragmentation of disks. Startup Programs. Repair tools and materials. Environmental factors. Backup procedures

**Outcome 3 covers:**

**Different Windows Operating Systems and features** — Windows 2000, Windows XP, Windows Vista, Windows 7. 32bit vs. 64bit architecture. Minimum system requirements, installation and upgrades. Application compatibility. User Interfaces

**User interfaces** — Start Menu, Windows Explorer, My Computer, Control Panel. Command prompt utilities. Registry Editing. Network Settings, task bar, Administrative Tools, MMCs.

**Operating System Installation and Configuration** — Hardware compatibility and Minimum resources requirements. File systems. File and folder attributes and permissions. Installation methods and media. Installation options. Driver signing. Power management, user profile migration

**Boot sequences, and startup utilities** — boot disk order, advanced start/boot options, recovery options

**Outcome 4 covers:**

**Networking fundamentals** — Technologies, devices and Protocols. IP Addressing. VPNs. Cables and connectors. Wired and Wireless Networks.

**Security** — security concepts and technologies. Encryption. Firewalls. Authentication. Data Security. Social Engineering. Virus protection. Password Policies.

## Higher National Unit specification: support notes (cont)

**Unit title:** Computing: PC Hardware and Operating Systems Essentials

**Outcome 5 covers:**

**Safety and environmental issues** — EMI, RFI. Electrical Safety, Physical Safety. Disposal procedures

**Communication and professionalism** — Language, attitude and listening skills. Punctuality. Dealing with Customers. Documentation.

### Guidance on the delivery 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 programmes in Computing, Networking or related area, giving candidates experience of basic background topics involved in the hardware and software aspects of computer networks.

To minimise assessment overhead, sets of multiple choice questions are used to provide evidence of candidates' knowledge for all Outcomes. It is suggested that multiple-choice questions can 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. The numbers of questions which must be answered correctly in each assessment correspond to 60% of those set in each case. Alternatively, a single end-of-Unit test of 36 questions may be used and candidates must answer at least 60% of the questions correctly in order to obtain a pass.

In terms of equipment required to deliver the Unit, candidates should have access to the Internet to download drivers and conduct searches. Additionally a Lab PC should be provided for candidates to assemble, configure, perform preventative maintenance and troubleshooting.

### Guidance on the assessment of this Unit

Evidence is required that candidates have achieved all Outcomes. Candidates are encouraged to use the Internet in any research etc, however, the evidence produced must be the candidate's own words. Assessors should assure themselves of the authenticity of candidate's evidence.

## Higher National Unit specification: support notes (cont)

**Unit title:** Computing: PC Hardware and Operating Systems Essentials

### Assessment Guidelines

#### Outcome 1–5

Evidence for the Knowledge and/or Skills for the entire Unit must be produced using a set of 36 multiple choice questions to assess candidate knowledge and understanding. This may be administered as a single end-of Unit test, or as several subtests, each covering one or more Outcomes.

**Candidates must answer at least 60% of the questions correctly in order to obtain a pass. If subtests are used, they must also score at least 60% in each subtest.**

Testing must take place in a closed-book environment where candidates do not have 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 invigilator 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.

When a centre is using an end-of-Unit test and as a number of Outcomes are being assessed together an assessor must ensure that each Outcome has been achieved by the candidate to successfully achieve a pass in this Unit.

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, eg 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.

**Assessors should ensure themselves of the authenticity of the candidate's evidence.**

### Online and Distance 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.

## Higher National Unit specification: support notes (cont)

**Unit title:** Computing: PC Hardware and Operating Systems Essentials

### 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 e-checklists. 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 one-assessment for Schools (BD2625, June 2005)*.

### Opportunities for developing 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.

### 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](http://www.sqa.org.uk/assessmentarrangements)

## History of changes to Unit

Version	Description of change	Date

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Additional copies of this Unit specification can be purchased from the Scottish Qualifications Authority. Please contact the Business Development and Customer Support team, telephone 0303 333 0330.

## General information for candidates

### Unit title: Computing: PC Hardware and Operating Systems Essentials

This Unit provides training towards the CompTIA A+ 220–701 2009 objectives and should precede the HN Unit **Computing: PC Hardware and Operating Systems Support**. The professional certification for A+ comprises two exams:

220–701      Essentials **and**  
220–702      Practical Applications

This Unit covers the 220–701 entry-level IT professional element. There may be an overlap of fundamental understanding and knowledge between this and A+ Essentials exams. In general, the HN Unit Computing: PC Hardware and Operating Systems Support follows the A+ 220–701 objectives and as such has a slightly different emphasis from the HN Unit Computing: PC Hardware and Operating Systems Support. The focus is on fundamental topics such as Hardware, Operating Systems, and support. A complete breakdown of the contents of the A+ exam and its constituent elements can be found at [www.comptia.org](http://www.comptia.org).

This Unit provides candidates with a string knowledge base helping them progress towards the more practical HN Unit Computing: PC Hardware and Operating Systems Support.

On completion of the Unit you should be able to:

- 1 Describe PC and laptop fundamentals.
- 2 Identify troubleshooting, repair and maintenance methods.
- 3 Identify operating systems and software features.
- 4 Describe networking and security.
- 5 Describe operational procedures in PC support.

There are two forms of assessment. The first is a multi-choice assessment that tests your knowledge of computer hardware, troubleshooting, operating systems, networks, security and user support. The minimum pass mark is 60%. The second contains a series of short assignments testing your practical abilities, and requires you to produce short design reports and complete a number of tasks to document your practical work.

All assessment will be carried out in supervised conditions, and the written assessments will be closed book, (ie you will not be allowed to bring any notes with you to the assessment event).

You will produce evidence to demonstrate your competence in practical tasks by maintaining a log using pro-forma record sheets. You will receive more detailed guidance on the content, style and quality required for your log entries during your progress through the Unit. Your assessor will observe you carrying out the assessment tasks, and will certify on each of your logs that it is your own work, whether it is satisfactory and whether you have carried out the work properly with regard to Health and Safety requirements.