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Unit title:	Computer systems
Unit number:	4
Level:	4
Credit value:	15
Guided learning hours:	60
Unit reference number:	L/601/0446

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### **UNIT AIM AND PURPOSE**

This unit will enable learners to understand a range of computer systems in terms of hardware and software and apply that knowledge to build and maintain a range of computer systems.

## **LEARNING OUTCOMES AND ASSESSMENT CRITERIA**

A pass grade is achieved by meeting **all** the requirements in the assessment criteria.

<b>Learning Outcome (LO)</b>	<b>Pass</b>
The Learner will:	The Learner can:
LO1 Understand the function of computer systems	1.1 explain the role of computer systems in different environments 1.2 explain the hardware, software and peripheral components of a computer system 1.3 compare different types of computer systems
LO2 Be able to design computer systems	2.1 produce a system design specification to meet a client's needs 2.2 evaluate the suitability of a system design specification
LO3 Be able to build and configure computer systems	3.1 build and configure a computer system to meet a design specification 3.2 test and document a computer system
LO4 Be able to undertake routine maintenance on computer systems	4.1 perform routine maintenance tasks on a computer system 4.2 upgrade the hardware and software on a computer system

## **GRADING CRITERIA**

A merit grade is achieved by meeting **all** the requirements in the pass criteria **and** the merit descriptors

A distinction grade is achieved by meeting **all** the requirements in the pass criteria **and** the merit descriptors **and** the distinction descriptors.

<b>Merit Criteria (M1, M2, M3)</b>	<b>Distinction Criteria (D1, D2, D3)</b>
(M1, M2, and M3 are mandatory to achieve a merit grade. Each must be achieved at least once per unit to achieve a merit grade.)	(D1, D2, and D3 are mandatory to achieve a distinction grade. Each must be achieved at least once per unit to achieve a distinction grade.)  (In order to achieve a distinction grade, all merit criteria must also have been achieved.)
<b>MANDATORY TO ACHIEVE A MERIT GRADE</b>	<b>MANDATORY TO ACHIEVE A DISTINCTION GRADE</b>
M1 Analyse concepts, theories or principles to formulate own responses to situations.	D1 Evaluate approaches to develop strategies in response to actual or anticipated situations.
M2 Analyse own knowledge, understanding and skills to define areas for development.	D2 Evaluate and apply strategies to develop own knowledge, understanding and skills.
M3 Exercise autonomy and judgement when implementing established courses of action.	D3 Determine, direct and communicate new courses of action.

## **TEACHING CONTENT**

The Teaching Content describes what has to be taught to cover **all** Learning Outcomes.

Learners must be able to apply relevant examples to their work although these do not have to be the same as the examples specified.

<b>LO1 Understand the function of computer systems</b>	
Types of computer system	e.g. personal computers (such as desktop systems, laptops), network computers (such as servers, workstations, distributed systems), remote systems and mobile computers, embedded computers
Different environments	e.g. home use, including personal/leisure use and home-office
Business environments	including general corporate use as well as familiar environments such as education, the health service
Hardware	e.g. CPU, motherboard, memory (RAM and ROM), internal storage (such as hard disk drives, SSD), removable storage (optical drives, flash drives), specialised add-on cards (such as graphics cards and sound cards), network interface devices, interface types and ports (e.g. USB, AGP, PCI)
Software	e.g. system software: operating system, utilities, application software (such as office software), proprietary and open source software
Peripherals	e.g. input peripherals (such as keyboard, mouse, cameras), output devices (such as monitor, printer), external storage peripherals (such as external hard drives), port replicators, network peripherals.
<b>LO2 Be able to design computer systems</b>	
Client's needs	e.g. purpose/use cases of system, hardware and software requirements, connectivity and bandwidth, constraints (such as financial, time, compatibility with existing systems)
System specification	e.g. selection of hardware/software components, performance characteristics of different hardware components, minimum requirements of software, future-proofing, maintenance
Producing a design	e.g. information collection (such as interview, questionnaire, observation), research, presentation/report writing, justifying choices, evaluation.

<b>LO3 Be able to build and configure computer systems</b>	
Build system	e.g. install hardware components (such as motherboard into case, CPU, add-on cards, drives), connect peripherals, install software (such as operating system, hardware drivers, applications), health and safety considerations
Configure system	e.g. physical configuration of pins/switches where available, BIOS settings, user and network configuration, initial settings of OS, applications and peripherals
Test system	e.g. POST and POST-codes, system information and diagnostic utilities, performance testing including load testing, scalability
Documentation	e.g. maintaining accurate logs, system documentation, test plans, maintenance plans.
<b>LO4 Be able to undertake routine maintenance on computer systems</b>	
Routine maintenance tasks	e.g. backup, malware scanning and removal, disk optimisation, system clean up, system updates
Upgrade hardware	e.g. investigate compatibility, replace components/peripherals, test for improved performance
Upgrade software	e.g. uninstall software/rollback, use of online repositories/automatic update, software patch installation/update, complete version upgrade, upgrading operating system.

## **GUIDANCE**

### **Delivery guidance**

It will be beneficial to deliver this unit in a way that uses actual events, industry forecasts or sector specific contexts which offer the learner the opportunity to explore, develop and apply the fundamental principles of the sector or subject area. Typical examples of organisations which could provide a context include charitable organisations, small companies, an educational setting such as an institute of higher education, and individual home worker. A range of different applications should be used to vary the context settings such as artists/musicians, sales/e-Commerce, game development, field agents (e.g. utility meter readers). This variety will ensure that learners cover a wide range of computer systems in their initial investigation.

When it comes to the practical tasks, however, it may be an advantage to require learners to focus on only one of the scenarios discussed as this will inform the material that learners will need to complete the tasks. Alternatively, a new design specification may be provided to the learners, for a different scenario, which fits the equipment provided. The systems built in this unit could be used for the delivery of a range of other units (e.g. Unit 14 Network Technologies and Unit 10 IT Security Management). Choosing a scenario for the practical tasks, which also lends itself to other units, offers some continuity in the program.

If the systems produced for LO3 are kept *in situ*, so that they can be used for other units, then the evidence for this learning objective is strongest if it comes out of routine maintenance of the system. Otherwise, it may be necessary to simulate the need for maintenance tasks and upgrades to be carried out in order to demonstrate their competence in LO4.

Learners will benefit from being encouraged to exercise autonomy and judgement when researching the requirements of the client and possible solutions. Providing a number of contexts for which a specification needs to be designed but not necessarily built, ensures that in some cases learners can investigate the most ideal solutions unconstrained by facilities and equipment available. Rather than providing learners with very detailed scenarios, clients' needs should be ascertained by research including clients' interviews, questionnaires or visits. Learners should also have the opportunity to adapt their thinking and reach considered conclusions when presenting and justifying the choices made for the different design specifications, troubleshooting and deciding what corrective action is needed, and when evaluating the practical work they have carried out.

### **Assessment evidence guidance**

Evidence produced must demonstrate how a learner has met each of the Learning Outcomes. This evidence could be assignments, project portfolios, presentations or, where appropriate, reflective accounts.

Where group work/activities contribute to assessment evidence, the individual contribution from each learner must be clearly identified.

All evidence must be available for the visiting moderator to review. Where learners are able to use real situations or observations from work placement, care should be taken to ensure that the record of observation accurately reflects the learner's performance. This should be signed, dated, and included in the evidence. It is best practice to record another individual's perspective of how a practical activity was carried out. Centres may wish to use a witness statement as a record of observation. This should be signed and dated and included in the evidence.

## **RESOURCES**

### **Books**

*BCS glossary of computing and ICT*. London: BCS, 2013.

Dick, David. *The P.C. support handbook: the configuration and systems guide*. Kirkintilloch: Dumbreck, 2001.

MacRae, Kyle, and Gary Marshall. *Build your own computer: the complete step-by-step manual to constructing a PC that's right for you*. Sparkford: Haynes, 2010.

MacRae, Kyle. *Haynes computer manual: the step-by-step guide to upgrading, repairing and maintaining a PC*. Sparkford: Haynes, 2010.

### **Journals**

Various industry periodicals including:

- Computer active
- Computer Shopper Magazine
- Computer Power User
- PC Advisor

### **Websites**

Numerous websites will provide relevant information, in particular the sites of vendors of systems and components. Learners should be encouraged to research such information rather than given links to them.