

Unit 3: Computer Systems

Unit code: H/601/3255

QCF Level 2: BTEC First

Credit value: 10

Guided learning hours: 60

● Aim and purpose

The aim of this unit is to introduce learners to the basic hardware and software components that make up computer systems and for learners to carry out basic installation and configuration.

● Unit introduction

Most learners will set up a computer system at some stage, which may belong to them or someone else and it may be a desktop, laptop, PDA or games console. To do this, learners need to know about the different elements of a computer system and how hardware works with software and how all the elements communicate to make the system function.

There are many different manufacturers of computer systems and each manufacturer will produce a wide range of models with different specifications. Being able to understand a computer systems technical specification (what all the jargon means) is important. Learners will spend some time in understanding the function of hardware and software components and assessing potential risks to systems.

In order to decide the requirements for a computer system and typical tasks it will be used for learners will specify hardware and software for different user requirements.

Learners will need to demonstrate that they can connect hardware devices safely and configure different types of software for a defined user. For this unit learners do not need to assemble a base unit but they will be connecting peripheral devices. Individuals have different needs and the ability to configure software to specifically suit those needs is necessary in order for individuals to make the best use of the technology.

Health and safety issues are always important when setting up and using electronic equipment and this unit will raise learners awareness of the hazards involved in both setting up and using computer systems.

● Learning outcomes

On completion of this unit a learner should:

- 1 Know the common components of computer systems
- 2 Know the different uses of computer systems
- 3 Be able to connect computer hardware
- 4 Be able to configure computer software.

Unit content

1 Know the common components of computer systems

Computer system: types eg PC, base unit, laptop, netbook, PDA, mobile phone, games consoles, tablet, server, embedded devices (inside phones, domestic appliances, cars)

Hardware components: processor speed and type; memory eg RAM, cache; storage devices, eg hard disk drive, memory stick, CD ROM, flash drive, DVD; input devices eg touch screen, graphics tablet, gaming controller, microphone, mouse, keyboard; output devices eg printer, monitor, sound; computer network connectivity eg 3G, Wireless, Bluetooth, NIC; costs

Software components: system software, applications software, software utilities

Security: risks eg phishing, malware, viruses, spam

Data flow: between components eg input, output, memory, processor; representations eg block diagrams, flow chart, images

2 Know the different uses of computer systems

Components: hardware; software

User: types eg home, office

User requirement: business need eg graphics design, company accounts; home use eg internet connectivity, online games; other eg portability, cost, accessibility features

Performance requirements: characteristics of component eg processor speed and type, data transmission speeds, storage capacity, battery life

3 Be able to connect computer hardware

Connections: peripheral devices eg printer, speakers, digital camera, USB devices, scanner, web cam, barcode reader, graphics tablet; appropriate connection eg network card, Bluetooth, USB, Cat5, Wireless

Testing: functionality eg for required use

Health and safety: electrical hazards; manual handling; impact on individuals

Working practices: working procedures; assess and minimise risks eg obtaining resources, recording relevant information; communicating progress and outcomes

4 Be able to configure computer software

Requirements: users eg office, home; tasks eg data recording, photo editing, media playback

Systems software: eg operating systems, systems software tools, diagnostic tools, file managers, disk utilities, back up, synchronisation; network connections eg workgroups, file sharing, internet access, email

Applications software: office applications software eg word processing, spreadsheet, database, graphics, presentation,; games software; communications, eg web browser, email

Utilities: clean up tools eg for cookies, internet history, defragmentation; drive formatting

Configure: editing the desktop eg icon size, font size, colour, background, icon choice; creating start-up options; creating and reconfiguring application toolbars; folder management eg access control, file permissions

Security: virus protection, firewall, other eg password protection, physical security

Assessment and grading criteria

In order to pass this unit, the evidence that learners present for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
P1 identify the common components of a computer system	M1 describe different ways to connect to a computer network	
P2 describe the purpose of different types of computer systems		
P3 represent how data flows around a computer system		
P4 specify suitable components to meet user requirements [IE1, IE2]	M2 give reasons for the choice of components to meet a given need [IE6]	D1 suggest alternative setups based on user feedback [CT5, RL4]
P5 connect hardware safely to a computer system, testing for functionality	M3 explain working practices and health and safety procedures when connecting hardware devices.	
P6 configure software for a given user requirement		D2 discuss how the configuration of software will help a given user perform their tasks. [CT1]
P7 identify potential security risks. [IE3]		

PLTS: This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

Key	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators

Essential guidance for tutors

Delivery

Learners will appreciate a practical approach to the delivery of this unit and, wherever possible, small group activity in supported workshops supplemented by structured lessons to the delivery of the underpinning theory would be appropriate.

The use of actual or realistic scenarios that might be encountered in a workplace will make this unit relevant to learners who may move on to employment in a technician role.

Some of the unit content could be delivered using case studies. Contact with actual IT practitioners who can describe their jobs should be encouraged; technicians and network administrators in schools and colleges are invaluable as are any outside visitors. Work experience would be valuable, if available.

This unit links directly to a range of other BTEC units and the vendor units and can be delivered in conjunction with these.

The term 'computer system' is becoming considerably more ambiguous. The emphasis in this unit is directed towards a desktop machine but can be equally suited to a range of laptops, netbooks and mobile devices so long as the learning outcomes are addressed fully.

Gaining an understanding of individual types of hardware would best be achieved through structured practical tasks in workshops but this may not always be possible. A good exercise can be for learners to research the meaning of technical jargon found in advertisements for computer systems and compare these systems based on a variety of parameters such as speed, storage capacity etc. Working in a groups to produce a poster describing the main elements of systems will also help develop understanding.

Learners do not need to dismantle machines, although they will enjoy this activity if it can be arranged, but a variety of peripheral devices will need setting up and configuring as part of formative skills development. The creation of appropriate materials (preparation – task instructions – follow-up checks) for a range of particular tasks would be valuable. Not all learners need to be working on the same task at the same time.

In terms of the understanding of the various types of software, a practical approach would be useful where possible. Individuals or small groups of learners could take particular items of software and give demonstrations perhaps based on some existing knowledge.

Configuration should be simple at this level and learners should practice configuring to particular requirements as suggested in the unit content.

Before undertaking any practical activities involving electrical equipment, learners must be aware of and follow appropriate health and safety procedures. It is strongly advised that learners are supervised during such activities to ensure the safe completion of tasks and the validity of individual evidence.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

Topic and suggested assignments/activities and assessment
Introduction to the unit
Hardware connections: <ul style="list-style-type: none">• whole-class exercise – tutor presentation on health and safety• whole-class exercise – tutor presentation on working practices• whole-class exercise – learners will investigate and experiment with a range of different devices• individual exercises – learners will conduct detailed investigations of selected devices.
Assignment 1 – What's What!
Software: <ul style="list-style-type: none">• whole-class exercise – learners will investigate and experiment with a range of different systems software, including operating systems and software tools• individual exercises – learners will conduct detailed investigations of selected aspects of systems software• whole-class exercise – learners will investigate and experiment with a range of application software and software utilities• individual exercises – learners will conduct detailed investigations of selected aspects of application software and software utilities.
Assignment 2 – The Best System for You
Whole-class exercise – learners will set up and configure systems to meet a range of tutor-selected scenarios.
Assignment 3 – Setting Up the System

Assessment

As this is an IT qualification, it is expected that IT equipment will be used wherever possible to create the different forms of evidence.

Where descriptive or explanatory evidence is required, appropriate observation records completed by both learners and tutor may form part of the evidence. Practical activities must be accompanied by observation records or witness statements (perhaps in the context of work or work placement experience). This should not usually be the only form of evidence for an individual criterion. Guidance on the use of observation records and witness statements is provided on the Edexcel website.

To achieve a pass grade, learners must achieve all the pass criteria listed in the assessment and grading criteria grid.

The suggested assignments are based on a requirement for a small business system.

For P1, learners can produce a leaflet describing the main components (both hardware and software) of a computer including peripherals. This could also be evidenced through a web page or any other format. The descriptions need only be brief but should be meaningful.

For P2, learners can again produce a leaflet or any other appropriate format to describe different types of system as suggested in the unit content.

For P3, it is expected the evidence will be diagrammatic and follow the standard input – process – output structure.

For P4, the hardware specification should include the computer system plus any peripherals that are required. The software specification should include systems, applications and utility software. It is suggested that this evidence is presented as a presentation, but any format may be used. It is important to note that learners will need feedback from this in order for them to work towards D1.

P5 and P6 must be evidenced practically, either in a supervised workshop environment within the centre, or during work or work placement activities. For P5, at least two peripherals should be connected. Depending on the resources available these may be identified by the tutor or chosen from a range available by learners. This could involve connecting a printer, webcam, wireless laptop etc. Evidence for practical activities must include observation records or witness statements, as appropriate, which should be carefully prepared to ensure that all steps in the connection of the peripherals have been completed individually by learners, and be supported by visual (eg photographic, video) or written evidence. Tutors may find it convenient to prepare a checklist to record completion of each step in the connection and testing process, which should be signed and dated and included with learner evidence. The tutor should ensure learners follow acceptable and safe working practices.

For P6, the specific purpose could be a user need or to meet the requirements of a business or both. Learners must configure systems, application and utility software. In order to show that adjustments have been made to the configuration, the software should be in its default state at the start of the process, the requirement clearly stated, and evidence provided of the results of the configuration process. It would be appropriate for this criterion to combine some written evidence, some visual evidence (such as screenshots, photographs) and appropriate observation records or witness statements showing pre- and post-configuration states.

For P7, learners should identify the potential risks to the system. The suggestion is that this is evidenced at the same time as P4, through a presentation to the user.

To achieve a merit grade, learners must achieve all of the pass criteria and all of the merit grade criteria.

For M1, the evidence can be incorporated with that for P1 or if this makes the leaflet too confused, a separate leaflet can be produced.

M2 naturally follows from P4. Tutors should identify a given user need which allows learners to justify their choice of hardware and software. The evidence would form part of the presentation.

M3 follows from P5 and learners can relate working practices and health and safety issues to the peripherals connected in P5. This is probably best evidenced with a written 'report'.

To achieve a distinction grade, learners must achieve all of the pass and merit criteria and the distinction grade criteria.

For D1, learners need to suggest alternative setups. These can be suggestions for different hardware or software but should be based on feedback from the users following the presentation of the specification for P4.

D2 follows on from P6, configuration. This requires learners to explain to the user how the configuration helps. It is suggested this could be presented as a memo to the user pointing out what has been done and why. Alternatively, a simple 'user guide' could be produced.

Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, P3, M1	What's What!	A small business has asked you to set up a computer system for them. They would like information leaflets describing different types of systems, the components of systems and how it all links together.	Information leaflets Diagrams
P4, P7, M2, D1	The Best System for You	Produce a proposal for a computer system to present to the managers of the business.	Presentation Supporting handouts
P5, P6, M3, D2	Setting Up the System	Set up a computer system by installing and testing peripherals and configuring software.	Witness statements Observation records Screenshots Memo/user guide

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC in IT sector suite. This unit has particular links with the following unit titles in the IT suite:

Level 1	Level 2	Level 3
		Unit 2: Computer Systems

This unit maps to some of the underpinning knowledge from the following areas of competence in the Level 2 National Occupational Standards for IT (ProCom):

- 4.1 Systems Architecture
- 4.3 Human Needs Analysis
- 4.4 Systems Analysis
- 4.6 Human Computer Interaction/Interface (HCI) Design
- 4.7 Systems Design
- 5.1 Systems Development
- 5.2 Software Development
- 6.2 IT Security Management.

Essential resources

Learners should have access to at least two additional peripheral devices, for example digital camera, scanner, webcam, barcode reader, graphics tablet and any associated software and cabling.

Employer engagement and vocational contexts

The use of vocational context is essential in the delivery and assessment of this unit. Learners will require access to computer equipment to enable them to gain a practical awareness and enable them to apply their knowledge and understanding in a practical situation.

There is a range of organisations that may be able to help centres engage and involve local employers in the delivery of this unit, for example:

- Learning and Skills Network – www.vocationallearning.org.uk
- Local, regional business links – www.businesslink.gov.uk
- National Education and Business Partnership Network – www.nebpn.org
- Network for Science, Technology, Engineering and Maths Network Ambassadors Scheme – www.stemnet.org.uk
- Work-based learning guidance – www.aimhighersw.ac.uk/wbl.htm
- Work Experience/Workplace learning frameworks – Centre for Education and Industry (CEI University of Warwick) – www.warwick.ac.uk/wie/cei.

Indicative reading for learners

Textbooks

Jennifer Fulton – *Complete Idiot's Guide to Upgrading and Repairing PCs* (QUE; 3rd Edition) ISBN 0789716429

White R and Downs T – *How Computers Work* (Que, 2003) ISBN 0789730332

Journals

Which? Computer

Computer Weekly

Websites

www.bized.co.uk

www.computerweekly.com

Delivery of personal, learning and thinking skills

The table below identifies the opportunities for personal, learning and thinking skills (PLTS) that have been included within the pass assessment criteria of this unit.

Skill	When learners are ...
Independent enquirers	identifying questions to answer and problems to resolve when specifying suitable components to meet user requirements planning and carrying out research, appreciating the consequences of decisions when selecting suitable components to meet user requirements exploring issues, events or problems when identifying potential security risks.

Although PLTS are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
Independent enquirers	supporting conclusions, using reasoned arguments and evidence when giving reasons for the choice components to meet a given need
Creative thinkers	trying out alternatives or new solutions when suggesting different setups based on user feedback. generating ideas and exploring possibilities of how the configuration of software will help a given user perform their tasks
Reflective learners	inviting feedback from users and dealing positively with praise, setbacks and criticism.

● Functional Skills – Level 2

Skill	When learners are ...
ICT – Using ICT	
Plan solutions to complex tasks by analysing the necessary stages	specifying suitable components to meet user requirements
Select, interact with and use ICT systems safely and securely for a complex task in non-routine and unfamiliar contexts	connecting hardware safely to a computer system, testing for functionality configuring software for a given user requirement
ICT – Developing, presenting and communicating information	
Evaluate the selection, use and effectiveness of ICT tools and facilities used to present information	identifying potential security risks.

