Systems and Principles Unit Syllabus

Level 2 Maintain ICT equipment and systems 2

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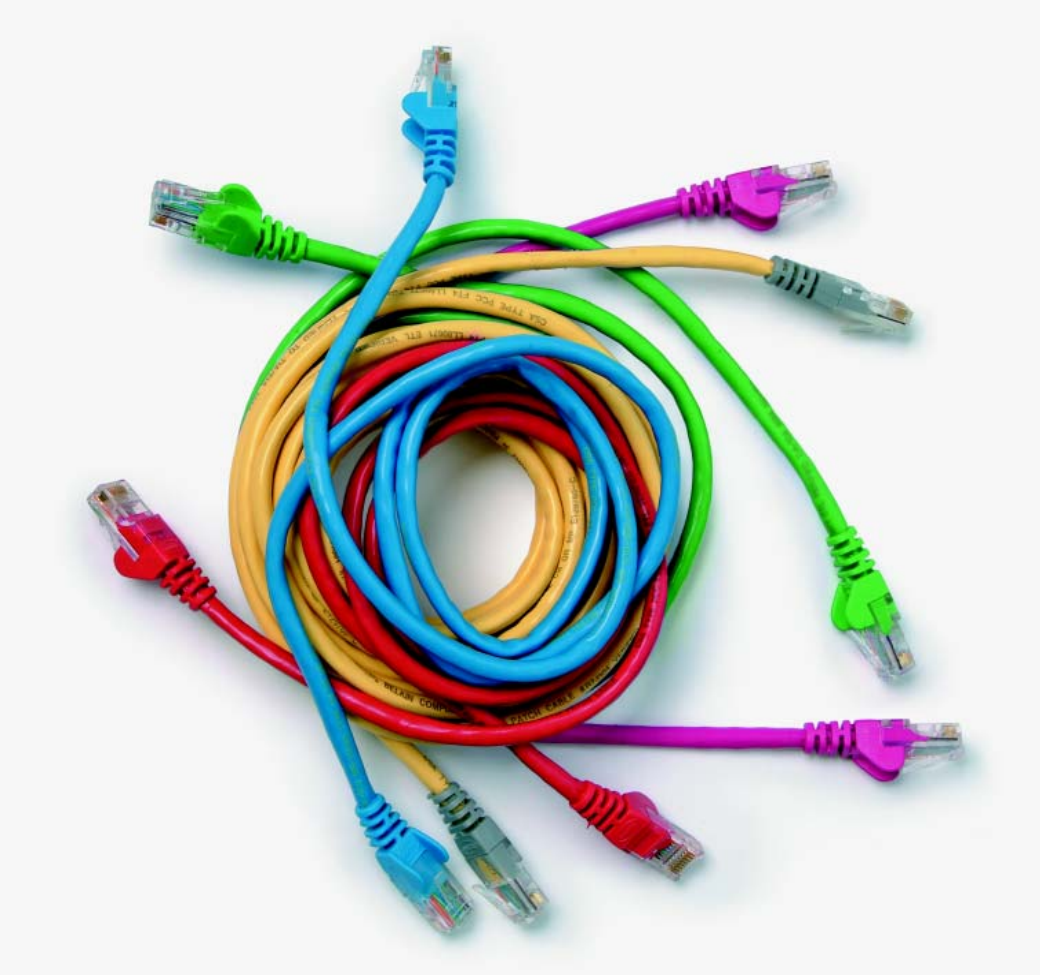

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Unit 228 Maintain ICT equipment and systems 2

Syllabus Overview

Unit accreditation number **K/501/3960**
Credit value **9**

Rationale

The ability to maintain ICT equipment and systems is a valuable skill in the IT support industry. This unit will enable candidates to identify and fix problems with ICT equipment. Candidates will develop theoretical and practical knowledge of identifying failures of ICT equipment, and applying corrective and preventative maintenance. It will also guide candidates in identifying hazards associated with ICT equipment and in establishing a safe working environment.

Learning outcomes

There are **three** outcomes to this unit. The candidate will be able to:

- Identify hazards associated with ICT equipment and reduce risks to systems and personnel
- Identify failures in ICT equipment and apply appropriate fixes
- Apply preventative maintenance to ICT systems

Guided learning hours

It is recommended that **70** hours should be allocated for this unit. This may be on a full time or part time basis.

Connections with other qualifications

This unit contributes towards the knowledge and understanding required for the Level 2 Diploma in ICT Professional Competence

Assessment and grading

Assessment will be by means of a **set assignment** covering practical activities and **an on-line multiple choice test** covering underpinning knowledge.

Unit 228 Maintain ICT equipment and systems 2

Outcome 1 Identify hazards associated with ICT equipment and reduce risks to systems and personnel

Practical activities

The candidate will be able to:

1 apply workplace health and safety procedures

2 perform a health and safety risk assessment to evaluate common hazards that exist in the workplace

3 use workplace procedures to minimise common workplace hazards and risks eg

- a trailing cables
- b noise levels
- c electric shock hazards
- d tools used in computer maintenance eg PC repair toolkit

4 comply with safe working practices when in a computer work environment considering eg

- a electrical safety
- b electrostatic discharge (ESD)
- c behaviour of self and others
- d other safety connected with dismantling and assembling a Personal Computer

5 demonstrate safe use of and manual handling techniques for ICT equipment eg

- a various tools eg ESD protection equipment, PC repair toolkit, multimeter
- b lifting/moving base units, monitors, printers etc
- c ICT workstation furniture

6 check fuse ratings and correct wiring of plugs for a range of items to comply with current regulations eg

- a monitor
- b base unit
- c printer
- d scanner

7 test common antistatic devices to ensure that they are functioning correctly

8 use antistatic precautions when working with static sensitive ICT equipment

9 set up an ICT system whilst complying with current regulations eg

- a health and safety
- b environmental
- c organisational requirements

Practical activities continued

10 demonstrate safe use of a PC with regard to
- a workstation ergonomics
- b preventing injuries caused by repeated use of a PC eg
  - i Repetitive Strain Injury (RSI)
  - ii Upper Limb Disorder (ULD)
- c minimising screen glare
- d adjustment of monitor contrast, colour and refresh rate

11 pack/unpack and fit static sensitive devices eg
- a printed circuit boards (system board, expansion cards)
- b disk drive (CD/DVD drive, hard disk)
- c RAM
- d CPU.

Underpinning knowledge

The candidate will be able to:

1 identify the people likely to be responsible for managing health and safety, and typical location/content of health and safety procedures

2 describe factors that affect health and safety at work
- a environmental (heating, dust, noise, etc)
- b occupational (risk of electric shock, ESD, etc)
- c human (training, change of behaviour, carelessness, etc)

3 define the main duties of employers and employees according to current health and safety at work legislation eg
- a safe working practices
- b co-operation with employer
- c not to endanger self or others

4 identify the main legal requirement for the use and disposal of hazardous substances

5 identify types of substances that are classified 'hazardous to health'

6 state typical health and safety responsibilities of employees (including the care of visitors to an organisation) in relation to
- a fire procedures and evacuation
- b accident reporting procedures
- c special safety features of the site
- d actions to be taken in an emergency

7 explain the difference between a hazard and a risk

Underpinning knowledge continued

8 state the steps needed to carry out a risk assessment by identifying eg
   - a hazards and risks
   - b who might be harmed and how
   - c likelihood of harm occurring
   - d what control methods need to be taken
   - e who would be responsible for putting the controls into practice and when

9 identify common hazards and risks associated with
   - a use and maintenance of equipment
   - b clothing and jewellery during maintenance activities
   - c use of materials or substances
   - d working practices that do not conform to health and safety procedures
   - e unsafe behaviour
   - f accidental breakage and spillage
   - g environmental factors
   - h hazardous voltages
   - j workshop tools

10 state the principles of safe use and manual handling for
   - a various tools
   - b lifting/moving base units, monitors, printers etc
   - c ICT workstation furniture

11 explain safety factors to be considered while using a PC eg
   - a workstation ergonomics
   - b injuries caused by the repeated use of a PC
   - c eye strain due to incorrect monitor settings

12 state the importance of using a correctly rated fuse and identify how to select the correct fuse for various items of ICT equipment

13 state the reasons for and the importance of portable appliance testing (PAT)

14 identify correct fire extinguishers for use on different types of fire
   - a powder for fires involving freely burning materials, petrol, oils, gas and electrical equipment
   - b water for tackling freely burning materials such as paper, cloth, wood and furniture
   - c Foam for fires involving volatile liquids and freely burning materials such as paper, cloth, wood and furniture
   - d CO_2 for fires involving an electrical risk like computers, office equipment and generators

Underpinning knowledge continued

15 describe ESD

- a what static electricity and electrostatic discharge (ESD) is
- b how static charge is generated
- c materials that can generate a static charge
- d typical voltages in ESD
- e effects of ESD on sensitive components
- f types of damage caused by ESD (intermittent or partial failures, delayed failures, catastrophic failures)
- g implications of ESD damaged equipment to an organisation
- h static control devices (wrist strap, bench mat, coat, shoes, air ionisers)
- j methods of controlling electrostatic discharge in the working environment (charge prevention, grounding, shielding, neutralisation, education)
- k importance of testing antistatic protection devices

16 state the importance of working with regard to

- a professional and ethical standards
- b integrity and confidentiality

17 state the importance of being accountable for the quality and effectiveness of your own responses to events.

Unit 228 Maintain ICT equipment and systems 2

Outcome 2 Identify failures in ICT equipment and apply appropriate fixes

Practical activities

The candidate will be able to:

1 gather accurate and relevant information on hardware failures eg
   - a base unit and internal parts
   - b keyboard
   - c mouse
   - d printer
   - e monitor
   - f scanner

2 diagnose causes of failures for the following ICT equipment
   - a video/sound
   - b monitor
   - c disk drives (optical media, hard drive)
   - d printer
   - e Network Interface Card (NIC)
   - f cables
   - g system board/RAM/CPU
   - h power supply unit
   - j operating system and software applications

3 use diagnostic tools to identify faults eg
   - a operating system tools
   - b third party hardware and software diagnostics
   - c equipment self test facilities

4 apply corrective hardware maintenance (fixes) to PCs following established procedures and using recommended parts and materials

5 apply corrective software maintenance (fixes) to PCs following established procedures and using recommended materials

6 check and confirm that fixes have been carried out successfully

7 produce a system fault report

8 maintain corrective maintenance records.

Underpinning knowledge

The candidate will be able to:

1 identify available sources of information that can assist with failure analysis eg
   - a error messages
   - b failure log
   - c site documentation
   - d installation log (software and hardware)
   - e diagnostic utilities
   - f escalation procedure

2 identify typical corrective actions necessary to fix hardware and software faults
   - a repair
   - b replace
   - c upgrade

3 state the typical procedures for reporting corrective actions

4 identify typical sources of information on carrying out corrective maintenance eg
   - a websites
   - b manufacturers' service manuals
   - c locally produced service manuals
   - d escalation procedures eg referral to immediate supervisors, experienced personnel

5 describe types of resource required for corrective maintenance
   - a procedures
   - b availability of parts
   - c available time
   - d materials
   - e expertise
   - f support

6 describe steps needed to be taken before applying corrective maintenance eg
   - a confirmation with procedure and or parts lists in the manufacturer's or supplier's manual
   - b referral to locally produced service manual
   - c own knowledge of this or similar problem
   - d confirmation by supervisor or experienced colleague
   - e referral to the user

7 describe tests that can be used to check that corrective maintenance has been carried out successfully

8 state problems which may arise from
   - a faulty replacement parts
   - b unexpected unavailability of equipment from user
   - c failure of tests
   - d fault has changed

Underpinning knowledge continued

9 state who should typically be informed when problems arise during corrective maintenance
   - a colleagues
   - b supervisor/manager
   - c manufacturer
   - d customer

10 describe common systems for recording corrective maintenance
   - a locally kept records
   - b maintenance manual
   - c logs in the equipment itself
   - d remotely held records

11 describe why it is important to record corrective maintenance eg
   - a records can be referred to during any other corrective maintenance
   - b removes duplication of effort when fault-finding problems
   - c records the parts used
   - d can be accessed by the user to ascertain if contract/maintenance of equipment is being carried out
   - e to ensure service level commitments are being met

12 describe what is meant by
   - a service operations
   - b an event
   - c a system administrator
   - d operations schedules
   - e event logs
   - f processing
     - i batch
     - ii online
     - iii real time
     - iv transaction
   - g software, hardware and network infrastructure

13 describe the importance of service operations and event management to an organisation and identify their role in ensuring the provision of IT systems, services and assets within an organisation

14 state the service operations that can be carried out remotely

15 identify who are the
   - a customers
   - b internal providers
   - c external providers

16 identify who needs to authorise actions to be taken

Underpinning knowledge continued

17 describe the importance of conducting tasks effectively and efficiently and in line with procedures and schedules

18 describe the potential implications to an organisation of work not being conducted in a timely and efficient manner

19 source, gather and collate information relating to tasks and events to respond to queries

20 describe the importance of referencing the service level information during service operations and recording all activities.

Unit 228 Maintain ICT equipment and systems 2

Outcome 3 Apply preventative maintenance to ICT systems

Practical activities

The candidate will be able to:

1 apply preventative maintenance using the recommended procedures, materials and parts

2 maintain different types of hardware eg

- a base unit
- b PSU/CPU fan
- c monitor
- d keyboard/mouse
- e printer/scanner
- f hard disk (defragmenter/scan disk/clear unwanted files)

3 maintain function of hardware by applying software fixes eg

- a anti-virus check/update
- b software patches/bug fixes/upgrades
- c driver updates
- d disk/data back-up

4 check the equipment to confirm that the preventative maintenance procedures have been carried out successfully

5 produce a report of problems encountered while carrying out preventative maintenance

6 maintain preventative maintenance records.

Underpinning knowledge

The candidate will be able to:

1 state the need for preventative maintenance

2 describe the importance of preventative maintenance for PCs and peripherals

3 identify where preventative maintenance procedures might be kept eg

- a with customer
- b with equipment
- c customer response centre

4 state why preventative maintenance procedures have to be co-ordinated with the user

5 identify indicators that would show a need for preventative maintenance

- a system initiated call
- b following replacement of a component part
- c locally kept records
- d periodic records

Underpinning knowledge continued

6 state typical resources needed to carry out preventative maintenance eg
   a availability of materials (for cleaning, routine replacement etc)
   b tools and equipment
   c manufacturers' service manuals
   d locally produced service manuals
   e escalation procedures
   f guidance from supervisors or other experienced colleagues
   g access to system
   h time allocation

7 identify specific material resources required to carry out computer maintenance eg
   a cleaning foam, cotton buds, compressed air
   b anti-virus software, drivers updates
   c software updates and bug fixes
   d third party utility programs
   e different tools eg PC repair toolkit

8 state problems which may arise from the following
   a faulty parts
   b unavailability of customer's system

9 state who should typically be informed of problems when applying preventative maintenance
   a colleagues
   b supervisor/manager
   c manufacturer
   d customer

10 explain post maintenance procedures
   a power on self test and other diagnostic routines
   b system test
   c failure reporting
   d materials return – used/unused

11 compare common methods of recording the implementation of preventative maintenance procedures eg
   a locally kept records
   b maintenance manual
   c logs in the equipment itself
   d site log

12 explain a range of preventative maintenance procedures for different types of hardware and software.

Unit record sheet

Use this form to track your progress through this unit.

Tick the boxes when you have covered each outcome. When they are all ticked, you are ready to be assessed.

Outcome	✓	Date
1 Identify hazards associated with ICT equipment and reduce risks to systems and personnel	☐	
2 Identify failures in ICT equipment and apply appropriate fixes	☐	
3 Apply preventative maintenance to ICT systems	☐	

Candidate Signature ..... **Date** .....

City & Guilds Registration Number .....

Quality nominee (if sampled) ..... **Date** .....

Assessor Signature ..... **Date** .....

External Verifier Signature (if sampled) ..... **Date** .....

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