Systems and Principles Unit Syllabus

Level 2 ICT Repair centre procedure 2

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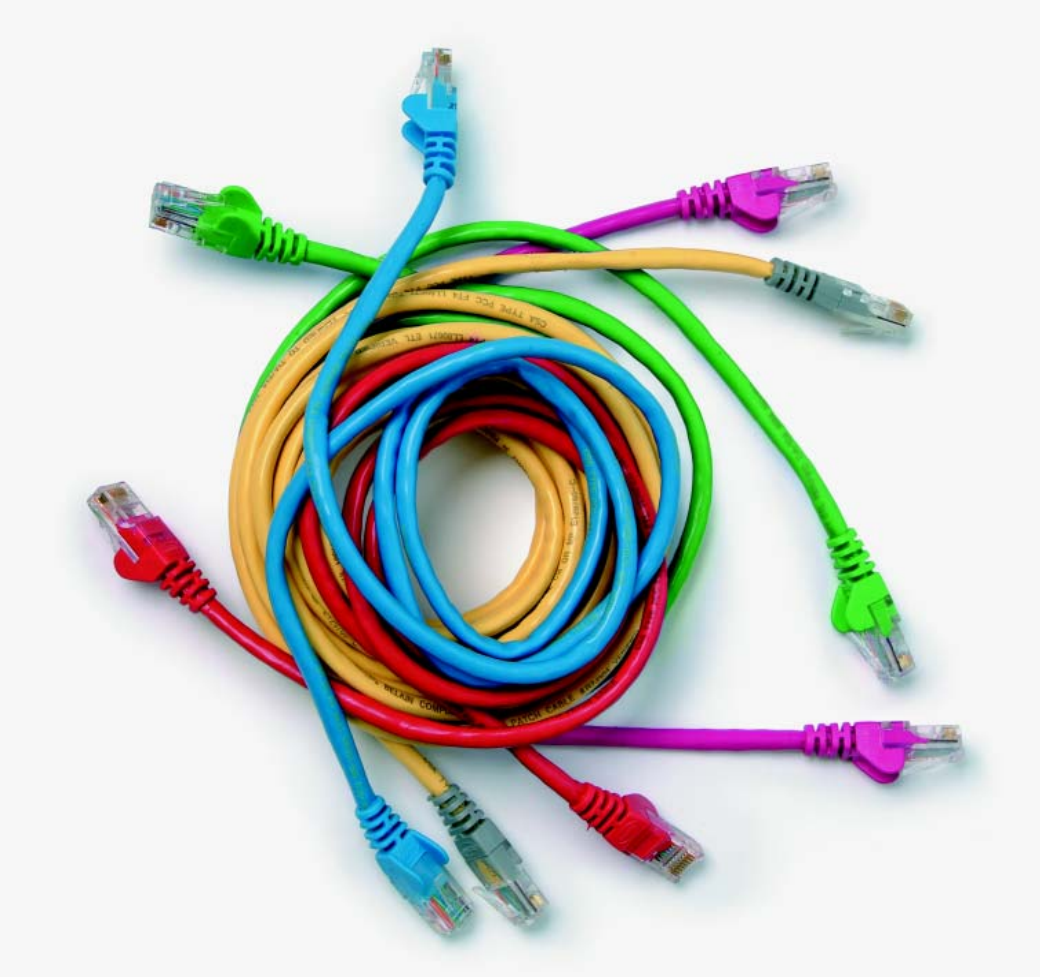

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Unit 233 ICT Repair centre procedure

Syllabus Overview

Unit accreditation number **A/501/4000**

Credit value **8**

Rationale

This unit will enable candidates to apply fault-finding and repair techniques on ICT equipment brought to a repair centre. Candidates will learn in particular to dismantle, assemble, modify and repair ICT equipment working within the boundaries of typical repair centre procedures.

N.B. This unit does not cover the repair of monitors and power supplies due to specific health and safety considerations.

Learning outcomes

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

- Use test equipment and diagnostic software to determine the condition of equipment
- Dismantle and reassemble common types of ICT hardware
- Identify and apply remedial solutions for failures in equipment

Guided learning hours

It is recommended that **30** 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 both practical activities and underpinning knowledge.

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Outcome 1 Use test equipment and diagnostic software to determine the condition of equipment

Practical activities

The candidate will be able to:

1 use standard safety measures to protect against common hazards associated with the handling and testing of electronic equipment eg
   - a antistatic wristbands, mats, clothing
   - b electrical safety
   - c packing and unpacking components and units
   - d protection of sharp edges
   - e use of tools

2 use test equipment eg
   - a digital/analogue multimeter
   - b oscilloscope
   - c signal generator
   - d loop-back connectors
   - e logic probe
   - f logic pulse meter

3 use diagnostic software
   - a diagnostic tools supplied with the operating system
   - b diagnostic tools supplied with equipment/devices
   - c third party diagnostic software

4 conduct appropriate tests to identify the source of the reported failures

5 perform pre-use safety and serviceability checks and correctly configure the test equipment

6 produce records of tests and other checks

7 use the results of tests and other evidence (eg sensory – smell, touch, sound etc), to determine the condition of the suspect items of hardware

8 perform standard post-installation functional tests on system components and sub-assemblies to confirm serviceability.

Underpinning knowledge

The candidate will be able to:

1 identify why it is important to adopt good health and safety practice in a repair centre
   - a legal requirements
   - b organisational requirements
   - c improved efficiency

2 describe current requirements of legislation relating to repair centre operations
   - a health and safety
   - b environment
   - c data protection
   - d software licensing

3 identify common hazards associated with the testing of ICT equipment eg
   - a power supplies
   - b damage/injury caused by unwanted movement of mechanisms
   - c laser radiation
   - d heat

4 list standard safety precautions to reduce or eliminate hazards in the testing environment eg
   - a use of various antistatic equipment
   - b eye protection
   - c clothing
   - d fume extraction
   - e tool safety
   - f training

5 list the common faults associated with ICT equipment and their likely causes
   - a power supply
   - b drives (hard drive, optical drives, FDD)
   - c system board/processor/memory
   - d expansion cards
   - e monitors (LCD, plasma, CRT)
   - f keyboard/mouse
   - g printer/scanner/web cam
   - h joystick/game pad
   - j speakers/microphone
   - k UPS
   - l other ICT devices

Underpinning knowledge continued

6 describe the common hardware test equipment, their uses and limitations
   a digital and analogue multimeter
   b portable appliance tester
   c oscilloscope
   d signal generator
   e other specialised equipment
7 identify sources of information on test procedures and equipment performance data eg
   a equipment technical manuals
   b manufacturer websites
   c diagnostic software
   d technical personnel
   e help/readme files
   f selected Internet sites
8 explain the signs and symptoms which may indicate a faulty item eg
   a visual signs
   b smell
   c feel
   d sound
9 describe the purpose of tolerances in applying calculations
10 identify common methods of recording test data, and explain the reasons for retaining records eg
   a customer's database
   b equipment log/record book
   c repairer's database
   d label attached to equipment.

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Outcome 2 Dismantle and reassemble common types of ICT hardware

Practical activities

The candidate will be able to:

1 take safety measures to prevent damage to equipment and individuals during the dismantling/re-assembly of ICT equipment
   - a use of antistatic equipment
   - b disconnection of mains power
   - c safe use of tools
   - d care from sharp edges
   - e manual handling procedures
   - f safe storage of parts
   - g personal safety

2 select and use tools eg
   - a screwdrivers
   - b IC extractor
   - c pliers
   - d soldering iron/de-soldering tool
   - e wire strippers
   - f tweezers
   - g contact cleaners
   - h nut drivers/spanners
   - j multimeter
   - k magnifier
   - l other testers and tools
   - m software tools

3 dismantle a PC base unit to module level, while considering
   - a back-up of data
   - b documenting the complete system (hardware and software)
   - c correctly identifying components and storing them to prevent loss, damage or deterioration

Practical activities continued

4 follow manufacturer's or locally produced instructions to fault fix components by assessing the condition of each component and taking necessary action eg
   a clean
   b replace
   c adjust
   d reconfigure
   e other specialised actions
5 reassemble a PC base unit to working condition
   a correctly identifying, preparing and installing each component
   b carrying out software installation, configuration and functional test of modules
6 dismantle and reassemble major components of peripherals eg
   a printer
   b scanner.

Underpinning knowledge

The candidate will be able to:

1 state the main features and functions of ICT system components eg
   a drives (hard drive, optical drives, FDD)
   b system board (down to module or function level)
   c processor/memory
   d expansion cards
   e monitors (LCD, plasma, CRT)
   f keyboard/mouse
   g printer/scanner/web cam
   h joystick/game pad
   j speakers/microphone
   k UPS
   l other ICT devices
2 describe the common hazards present during assembly and dismantling of a system, and the precautions that can be taken to eliminate them
3 explain the importance of documenting and backing up software, especially data, prior to carrying out any dismantling or repair of the system
4 state the importance of only dismantling as far as necessary to complete a particular maintenance task

Underpinning knowledge continued

5 state types of material and equipment which should be protected and how
   a scanner lamps
   b laser units
   c fusion units
   d disk drives
   e printed circuit boards
6 describe typical problems that could occur during dismantling and what actions could be taken to prevent them considering
   a self
   b damage to/loss of equipment/components
7 describe how to assess the usability of different components
8 state what types of components may and may not be reused
   a **may** eg
      i shafts
      ii gears
      iii undamaged
      iv casing and chassis
      v non-critical screws
      vi nuts, plain washers
      vii components not showing signs of wear and deterioration
   b **may not** eg
      i printer feed rollers
      ii gears
      iii bushes
      iv drive belts
      v components showing significant signs of wear
      vi components designated as not being re-usable (inkjet cartridges, damaged components)
      vii critical components (corona wire, locking devices, filter elements made from paper/gauze)
      viii safety devices (micro-switches where there is any doubt as to their integrity)
9 explain the reasons for installing and configuring software back to user requirements
10 describe how to prepare ICT hardware for transportation, storage and disposal
   a antistatic protection
   b shipping locks
   c impact protection
11 state the importance of disposing of hardware in an environmentally- friendly way and according to current legal requirements.

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Outcome 3 Identify and apply remedial solutions for failures in equipment

Practical activities

The candidate will be able to:

1 use the results of testing procedures to identify remedial solutions for
   a software problems
   b hardware problems

2 select the most appropriate solution for hardware and software problems

3 apply remedial actions to PC systems including peripherals
   a repair
   b replace
   c upgrade
   d configure
   e other software options

4 install software and data to enable the functional testing of equipment
   a operating system
   b application software
   c utility software
   d security software

5 perform standard post installation functional tests for replaced components to confirm serviceability of
   a new components
   b system(s) affected by replacement component(s)

6 perform a full functional test of equipment before delivery to the customer and document the results

7 maintain centre and customer documentation, including all external communications, to company standards.

Underpinning knowledge

The candidate will be able to:

1 list commonly used remedial solutions for
   - a software failures eg
     - i re-install
     - ii re-configure
     - iii upgrade
   - b hardware failures eg
     - i repair existing component
     - ii replace with same specification component
     - iii upgrade to higher specification component

2 state sources of information to assist in the selection of possible solutions eg
   - a manufacturer's technical information in service manuals
   - b manufacturer's website
   - c reference books
   - d experienced supervisors and colleagues
   - e website forums

3 list the factors to consider when selecting remedial solutions eg
   - a system operational requirements
   - b cost
   - c spares availability
   - d future system requirements
   - e risk
   - f products/services and equipment provided by an external service
   - g procedures
   - h locations

4 state the hazards present in typical ICT components, and the precautions to be taken when disposing of them eg
   - a spent toner/ink cartridges
   - b laser units
   - c fusion units
   - d sub-assemblies containing electrolytic capacitors

5 explain how to carry out post installation functional tests for replaced components to confirm serviceability of
   - a new components
   - b system(s) affected by replacement component(s)

6 describe how to perform a typical full functional test of equipment and any necessary updates before delivery to a customer

7 state the importance of documenting results and updating centre/customer documentation including all external communications to company standards

8 identify the severity and priority of incoming incidents and problems, and respond accordingly, and understand the implications of service levels

Underpinning knowledge continued

9 state professional and ethical standards while working

10 describe the importance of complying with change control

11 describe the importance of complying with business case procedures

12 state what is meant by

- a technical support
- b a patch
- c a release
- d an infrastructure refresh programme

13 List common types of activities undertaken by technical support.

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	**Use test equipment and diagnostic software to determine the condition of equipment**	☐	
2	**Dismantle and reassemble common types of ICT hardware**	☐	
3	**Identify and apply remedial solutions for failures in equipment**	☐	

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

City & Guilds Registration Number .....

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

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

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

Centre Name ..... **Centre Number** .....

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