



**education**

Department:  
Education  
REPUBLIC OF SOUTH AFRICA

# **NATIONAL CERTIFICATE (VOCATIONAL)**

## **SUBJECT GUIDELINES**

### **COMPUTER HARDWARE AND SOFTWARE NQF Level 3**

September 2007



# **COMPUTER HARDWARE AND SOFTWARE – LEVEL 3**

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## INTRODUCTION

### **A. What is Computer Hardware and Software?**

Computer Hardware and Software provides the student with competency skills for giving technical assistance in both hardware and software of the computer.

Computer Hardware and Software is a more practical subject which requires students to build, install and fix hardware and software errors as well as troubleshooting.

### **B. Why is the subject important in the Information Technology programme?**

Computer Hardware and Software forms a solid foundation enabling students to build on this base as they move onto the next levels of this qualification and in particular to Data Communication and Networking at Level 4.

### **C. The link between the Computer Hardware and Software Learning Outcomes and the critical and developmental outcomes**

The student will be able to identify and solve problems, collect, analyse, organise, critically evaluate information that is related to information systems. The student will also be able to demonstrate an understanding of the world as a set of related systems by recognizing problem solving contexts do not exist in isolation.

### **D. Factors that contribute to achieving the Computer Hardware and Software Learning Outcomes**

- The ability to think logically and analytically, as well as holistically and laterally; and
- Be able to transfer skills from familiar to unfamiliar situations
- Keen powers of observation
- Meticulous
- Interest in computers and related topics

## 1 DURATION AND TUITION TIME

This is a one year instructional programme comprising 200 teaching and learning hours. The subject may be offered on a part-time basis provided all of the assessment requirements are adhered to.

Course preparation should consider students with special education needs.

## 2 SUBJECT LEVEL OUTCOME

- Explain the principles of computer hardware and software.

## 3 ASSESSMENT REQUIREMENTS

### 3.1 Internal assessment (50 percent)

#### 3.1.1 Theoretical Component

The theoretical component will form 40 percent part of internal assessment.

Internal assessment of the theoretical component of Computer Hardware and Support NQF Level 3 will take the form of observation, class questions, group work, (informal group competitions with rewards), individual discussions with students, class, topic and semester tests, internal examinations. Daily observation can be done when marking exercises of the previous day and class questions.

Assignments, case studies and tests can be done at the end of a topic. Tests and internal examinations must form part of internal assessment.

#### 3.1.2 Practical/Application Component

Practical components include applications and exercises. All practical components must be indicated in a Portfolio of Evidence (PoE).

The practical component will form 60 percent part of internal assessment.

Internal assessment of the practical component of Computer Hardware and Software NQF Level 3 will take the form of assignments, practical exercises, case studies, practical examination in a simulated business environment.

Students may complete practical exercises on a daily basis. Assignments and case studies can be done at the end of a topic. Practical examination can form part of internal assessment.

- **Some examples of practical assessments include, but are not limited to:**
  - Presentations (lectures, demonstrations, group discussions and activities, practical work, observation, role play, self activity, judging and evaluation)
  - Use of aids
  - Exhibitions
  - Visits
  - Guest speaker presentations
  - Research
  - Task performance in a simulated/structured environment

- **Definition of the term “Structured environment”**

“Structured environment” for the purposes of assessment refers to an actual or simulated workplace, or workshop environment. It is advised that a practicum room is available on each campus for practical assessment.

- **Evidence in practical/application assessments**

All evidence pertaining to evaluation of practical work must be reflected in the student’s PoE. The tools and instruments constructed and used for the purpose of conducting such assessments must be clear from evidence contained in the PoE.

### 3.1.3 Processing of Internal assessment mark for the year

A year mark out of 100 is calculated by adding the marks of the theoretical component and the practical component of the internal continuous assessment.

### 3.1.4 Moderation of internal assessment mark

Internal assessment is subjected to both internal and external moderation procedures as contained in the *National Examinations Policy for FET College Programmes*.

## 3.2 External assessment (50 percent)

A national examination is conducted annually in October or November by means of a paper set externally and marked and moderated internally.

Details in respect of external assessment are contained in the *Assessment Guidelines: Computer Hardware and Software (Level 3)*.

## 4 WEIGHTED VALUES OF TOPICS

TOPICS	WEIGHTED VALUE
1. Concepts of computer architecture	10%
2. Types of computer systems and hardware configurations	10%
3. PC or handheld computer hardware components	10%
4. Assemble a PC or handheld computer and peripherals into modules	5%
5. Install system and application software for a PC or handheld computer	10%
6. Installation of PC or handheld computer peripherals	10%
7. Test IT systems against given specifications	10%
8. Preventative maintenance, environment and safety issues in a computer environment	10%
9. Technical computer problems	5%
10. Computer user's problems	5%
11. Problem solving strategies	5%
12. Repair a PC, handheld computer and peripherals to module level	10%
<b>TOTAL</b>	<b>100</b>

## 5 CALCULATION OF FINAL MARK

Continuous assessment: Student's mark/100 x 50/1 = a mark out of 50 (a)

Theoretical examination mark: Student's mark/100 x 50/1 = a mark out of 50 (b)

**Final mark: (a) + (b) = a mark out of 100**

All marks are systematically processed and accurately recorded to be available as hard copy evidence for, amongst others, purposes of moderation and verification, as well as for purposes of reporting.

## 6 PASS REQUIREMENTS

The Student must obtain at least fifty (50) percent in ICASS and fifty (50) percent in the examination.

## 7 SUBJECT AND LEARNING OUTCOMES

On completion of Computer Hardware and Software Level 3 the Student should have covered the following topics:

Topic 1:	Concepts of computer architecture
Topic 2:	Types of computer systems and hardware configurations
Topic 3:	PC or handheld computer hardware components
Topic 4:	Assemble a PC or handheld computer and peripherals into modules
Topic 5:	Install system and application software for a PC or handheld computer
Topic 6:	Installation of PC or handheld computer peripherals
Topic 7:	Testing of IT systems against given specifications
Topic 8:	Preventative maintenance, environment and safety issues in a computer environment
Topic 9:	Technical computer problems
Topic 10:	Computer user's problems
Topic 11:	Problem solving strategies
Topic 12:	Repair a PC, handheld computer and peripherals to module level

### 7.1 Topic 1: Concepts of computer architecture

#### 7.1.1 Subject Outcome 1: Explain computer architecture elements

##### Learning Outcomes

The student should be able to:

- Identify the functions of elements that make up computer architecture.
- Outline the functions of the elements that make up computer architecture.
- Distinguish between the categories of each element and outline their features.
- Identify examples of the application of architecture elements.

#### 7.1.2 Subject Outcome 2: Explain the organization of a computer

##### Learning Outcomes

The student should be able to:

- Identify the purpose of computer components.
- Outline how components achieve their outcomes in terms of their relationships and the structure of the computer.

#### 7.1.3 Subject Outcome 3: Describe the design constraints in the design of instruction sets for computers

##### Learning Outcomes

The student should be able to:

- Identify the constraints and outline the issues involved.
- Outline using examples how the constraints can be accommodated

### 7.2 Topic 2: Types of computer systems and hardware configurations

#### 7.2.1 Subject Outcome 1: Describe past, present and future computer hardware configurations

##### Learning Outcomes

The student should be able to:

- List the characteristics of configurations.
- Justify the categorization of examples.
- Explain the performance characteristics of the configurations.
- Explain the environmental requirements of the configurations.

## **7.2.2 Subject Outcome 2:** Describe the categories of computer system applications

### **Learning Outcomes**

The student should be able to:

- Identify the categories of computer system applications.
- Justify the categorisation of examples.
- Explain the performance characteristics of the categories.

## **7.3 Topic 3: PC or handheld computer hardware components**

### **7.3.1 Subject Outcome 1:** Describe the characteristics of personal computer hardware components

#### **Learning Outcomes**

The student should be able to:

- Identify the purpose of a component using examples as well as providing an outline of its functions.
- Outline the operating principles of a component.
- Outline the relationship between components by describing the interaction between them.
- Describe the resources required for the installation and ensure that they are available at the time of installation and are in working order.

### **7.3.2 Subject Outcome 2:** Compare and select personal computer hardware components

#### **Learning Outcomes**

The student should be able to:

- Compare the performance measures of components.
- Outline and compare the relationship between performance and system use.
- Compare all available options and justify the selection of personal computer hardware components for a given situation.

### **7.3.3 Subject Outcome 3:** Test personal computer hardware components

#### **Learning Outcomes**

The student should be able to:

- Explain and demonstrate to ensure that tests are completed to an industry recommended practice.
- Identify faulty components through testing.

## **7.4 Topic 4: Assemble a PC or handheld computer and peripherals into modules**

### **7.4.1 Subject Outcome 1:** Plan the assembly of a single user PC and peripherals

#### **Learning Outcomes**

The student should be able to:

- Identify and explain the feasibility of the planned specification.
- Explain and demonstrate how the plan estimates the effort, duration and resources required for assembly.
- Explain and demonstrate how the plan adopts a review procedure that ensures that the final outcome meets the user requirements.
- Explain and demonstrate how the plan ensures that the assembly environment conforms to the manufacturer's specification.
- Explain and demonstrate how the plan ensures that the resources required to complete the assembly are available at the assembly site, and are in good working order.



#### **7.4.2 Subject Outcome 2:** Assemble a single-user personal computer and peripherals from modules

##### **Learning Outcomes**

The student should be able to:

- Explain and demonstrate the assembly according to the manufacturer's specification.
- Explain and demonstrate how the assembly ensures that the hardware completes the manufacturer's diagnostic test free of errors.
- Explain and demonstrate how to customise and configure the system and application software according to assembly specifications.

#### **7.4.3 Subject Outcome 3:** Test single-user PC and peripherals

##### **Learning Outcomes**

The student should be able to:

- Explain and demonstrate what "burn-in" testing is and ensure that it completes free of errors according to the assembly specifications.
- Explain and demonstrate the testing procedure ensuring that it meets manufacturer's guidelines.
- Demonstrate how test results are recorded according to organization specifications.
- Demonstrate how the test ensures that system software communicates with the hardware modules in accordance with the manufacturer's and assembly specifications.

#### **7.4.4 Subject Outcome 4:** Dispatch single-user personal computers and peripherals

##### **Learning Outcomes**

The student should be able to:

- Explain and demonstrate the dispatch procedure ensuring that the units are packed according to manufacturer and assembly specifications.
- Explain and demonstrate the dispatch procedure ensuring that the documentation is completed according to manufacturers and organization requirements.
- Explain and demonstrate the dispatch procedure ensuring that the units are forwarded according to the assembly specification.

### **7.5 Topic 5: Install system and application software for a PC or handheld computer**

#### **7.5.1 Subject Outcome 1:** Plan the installation of system software and application software for a single-user personal computer

##### **Learning Outcomes**

The student should be able to:

- Explain how the plan reviews the software specification and the feasibility of the specification.
- Explain how the plan estimates the time and resources required for the installation, and specify any milestones.
- Explain how the plan ensures that the installation is scheduled to minimise disruption to the user.
- Explain how the plan adopts a review procedure which ensures that the final outcome meets user requirements.

#### **7.5.2 Subject Outcome 2:** Install system software and application software for a single-user personal computer

##### **Learning Outcomes**

The student should be able to:

- Demonstrate how the installation procedure follows the publisher's guidelines.
- Demonstrate how the installation procedure ensures that the software operates according to the publisher's specifications.
- Explain and demonstrate how the installation ensures that the pre-installation environment is restored in the event of an unsuccessful installation.
- Demonstrate how the installation ensures that the software is configured and customised according to installation specifications.

**7.5.3 Subject Outcome 3:** Test installation of system software and application software for a single-user personal computer

**Learning Outcomes**

The student should be able to:

- Explain and demonstrate how the test verifies that the software functions according to the publisher's specification.
- Explain and demonstrate how the test procedure meets the publisher's guidelines.
- Demonstrate how the test verifies that the software functions in a specified environment.
- Explain and demonstrate how the test verifies that the system software communicates with hardware, peripherals and other application software according to the installation specification.

**7.5.4 Subject Outcome 4:** Accomplish user acceptance sign-off for the installation system software and application software

**Learning Outcomes**

The student should be able to:

- Explain and demonstrate how the user acceptable sign-off outlines the publisher's operating procedures and allows the user to begin operating the system.
- Explain and demonstrate how the user acceptable sign-off provides training and support options to the user.
- Explain and demonstrate how the user acceptable sign-off reviews the installation and allows the user to determine whether the installation has been complete.

**7.6 Topic 6: Installation of PC or handheld computer peripherals**

**7.6.1 Subject Outcome 1:** Plan the installation of a single-user personal computer and peripherals

**Learning Outcomes**

The Student should be able to:

- Identify the plan and explain the feasibility of the specification.
- Explain how the plan identifies the time and resources required for the installation.
- Explain how the plan adopts a review procedure which ensures that the final outcome meets the user requirements.

**7.6.2 Subject Outcome 2:** Install a single-user computer and peripherals

**Learning Outcomes**

The student should be able to:

- Demonstrate how the installation ensures that the hardware units match the installation specification.
- Demonstrate how the installation ensures that the hardware units are located in accordance with the installation and the manufacturer's specifications.
- Demonstrate how the installation ensures that the hardware units are interconnected according to the installation and manufacturer's specifications.
- Demonstrate how the installation ensures that the hardware units complete the manufacturer's diagnostic tests free of errors.
- Demonstrate how the installation ensures that the system software is configured and customized according to the installation and the manufacturer's specifications.

**7.6.3 Subject Outcome 3:** Test the installation of a single-user computer and peripherals

**Learning Outcomes**

The student should be able to:

- Demonstrate how the test ensures that the computer system operates according to the manufacturers and installation specifications.
- Demonstrate how the testing procedure meets the manufacturer's guidelines.
- Explain and demonstrate how the test results are recorded according to the organizations specifications.
- Demonstrate how the test ensures that the system software and application software communicate with the hardware according to the manufacturer's specifications.

**7.6.4 Subject Outcome 4:** Gain user acceptance for the installation of a single-user computer and peripherals

#### **Learning Outcomes**

The student should be able to:

- Explain how by using the manufacturer's supplied operating procedures users can begin operating the system.
- Explain how through the use of training and support options users can obtain training and support.
- Explain how by reviewing the installation and installation specification the users are able to judge that the installation has been completed.

### **7.7 Topic 7: Testing of IT systems against given specifications**

**7.7.1 Subject Outcome 1:** Select an appropriate test procedure for the IT Systems to be tested

#### **Learning Outcomes**

The student should be able to:

- Explain how the selection clarifies the purpose of the test and the data required from it.
- Explain how the selection identifies any factors that may affect the choice of the tests procedure.
- Explain how the selection identifies the resources available for the test procedure.
- Explain how the selection complies with all relevant regulatory, licensing, contractual and health and safety requirements.

**7.7.2 Subject Outcome 2:** Apply the test procedure to the IT Systems to be tested

#### **Learning Outcomes**

The student should be able to:

- Explain and demonstrate how the application ensures the correct preparation of the test procedure.
- Explain and demonstrate how the application tests the hardware using the selected test procedure.
- Explain and demonstrate how the application tests the software using the selected test procedure.
- Explain and demonstrate how the application ensures that all performance parameters and operational requirements are tested.
- Explain and demonstrate how the application identifies any problems with the test procedure and takes appropriate action.
- Explain how the application complies with all relevant regulatory, licensing, contractual and health and safety requirements.

**7.7.3 Subject Outcome 3:** Collect and record data from tests

#### **Learning Outcomes**

The student should be able to:

- Explain and demonstrate how the recording ensures that the required data was produced.
- Explain how the recording ensures that the data was correctly collected.
- Explain how the recording ensures that the data are sufficient to meet the purpose of the test.
- Explain and demonstrate how the recording identifies any problems with the collection of data and takes appropriate action.
- Explain and demonstrate how the results are recorded using an appropriate information system.

**7.7.4 Subject Outcome 4:** Prepare the testing to ensure the given specifications will be addressed

#### **Learning Outcomes**

The student should be able to:

- Explain how the preparation ensures that a plan is prepared for the testing in line with the given specifications.
- Explain how the preparation ensures that the plan specifies what needs to be tested.
- Explain how the preparation documents the test scenarios and test data to be used for the test.
- Explain how the preparation documents the outcomes expected for each of the scenarios prepared.

## **7.8 Topic 8: Preventative maintenance, environment and safety issues in a computer environment**

**7.8.1 Subject Outcome 1:** Demonstrate an understanding of the use of preventative maintenance measures and procedures

### **Learning Outcomes**

The student should be able to:

- Identify the causes of computer hardware maintenance.
- Demonstrate preventive measures for the causes of computer hardware maintenance.

**7.8.2 Subject Outcome 2:** Demonstrate an understanding of the use of safety measures and procedures

### **Learning Outcomes**

The student should be able to:

- Explain and demonstrate safety measures for different types of fires and those that apply to computer environments.
- Demonstrate potential hazards and safety procedures relating to the computer environment.
- Demonstrate Electrostatic Discharge (ESD) and the precautions that can be taken for it.

**7.8.3 Subject Outcome 3:** Explain environmental protection measures and procedures of a computer working environment

### **Learning Outcomes**

The student should be able to:

- Explain and demonstrate the handling of computer components.
- Explain and demonstrate the handling of computer peripheral components.

## **7.9 Topic 9: Technical computer problems**

**7.9.1 Subject Outcome 1:** Troubleshoot technical computer problems, identifying possible course of action

### **Learning Outcomes**

The student should be able to:

- Explain and demonstrate how the troubleshooting verifies the reported symptoms and identifies any further symptoms.
- Explain and demonstrate how the troubleshooting uses information sources to identify known problems.
- Explain and demonstrate how the troubleshooting uses industry recommended procedures to identify the cause of the problem.
- Explain and demonstrate how the troubleshooting results in undiagnosed problems been forwarded to technical expert support staff for assistance.

**7.9.2 Subject Outcome 2:** Provide solutions to technical computer problems, including time estimates, cost and resources

### **Learning Outcomes**

The student should be able to:

- Explain how the provision estimates the cost and benefits of the solution to allow a judgement to be made about implementing the solution.
- Describe how the provision describes the solution so that a judgement can be made about the feasibility and effectiveness of the solution.
- Explain how the provision ensures that a plan for implementing the solution estimates the time and resources required and specified milestones.

### **7.9.3 Subject Outcome 3:** Maintain information logs of problems identified

#### **Learning Outcomes**

The student should be able to:

- Explain and demonstrate how the information logs are maintained in a recording system for problems and solutions.
- Outline and explain how the information log maintenance identifies sources for occurrence volumes for problems and solution for future reference of technical support in the area of expertise.
- Explain how the information log identifies sources for new information and trends for future reference of technical support in the area of expertise.
- Explain and demonstrate how the information logs maintained show an understanding of the need for information logs as sources of information for future reference of technical support for the area of expertise.

### **7.10 Topic 10: Resolve computer user's problems**

#### **7.10.1 Subject Outcome 1:** Receive computer user's problems

##### **Learning Outcomes**

The student should be able to:

- Explain and demonstrate how the request received identifies the users and their terms of support so that the response procedure can be determined.
- Explain and demonstrate how the request received records sufficient information about the problem to begin an investigation.
- Explain and demonstrate how the contact with the users of the request received must employ a personal communication technique, which allows users to feel that the problem will be resolved to their satisfaction.
- Explain and demonstrate how the request received is assigned a timeframe and priority to the problem according to the organisation standards and the terms of the support agreement for each user.

#### **7.10.2 Subject Outcome 2:** Investigate computer user's problems

##### **Learning Outcomes**

The student should be able to:

- Explain how the investigation uses information sources to identify known problems.
- Explain how the investigation uses industry recommended procedures to identify the cause of the problem.
- Explain and demonstrate how the investigation records symptoms of unresolved identified problems to technical support services to resolve.
- Explain and demonstrate how the investigation advises third parties of the progress according to the terms of the user's support agreement.

#### **7.10.3 Subject Outcome 3:** Implement solutions to computer user's problems

##### **Learning Outcomes**

The student should be able to:

- Explain how the implementation ensures that the user's system is returned as soon as possible.
- Explain and demonstrate how the implementation uses reference data sources to identify known solutions to known problems.
- Explain how the implementation designs solutions for any new problems identified.
- Explain how the implementation records the action taken in sufficient detail to allow it to be repeated.
- Explain and demonstrate how the implementation monitors progress of a solution so that users may be advised of progress according to the terms of their support agreement.

#### **7.10.4 Subject Outcome 4:** Close resolved computer user's problems

##### **Learning Outcomes**

The student should be able to:

- Explain and demonstrate how the closure presents a report on the resolution of each problem to the user, so that they may judge that the problem has been satisfactorily resolved.
- Explain and demonstrate how the closure records the resolution of the problem according to organisation standards and procedures.

#### **7.10.5 Subject Outcome 5:** Forward unresolved computer user's problems to appropriate area

##### **Learning Outcomes**

The student should be able to:

- Explain and demonstrate how the extension of the problem is reported to the user involved, according to the terms of their support agreement.
- Explain and demonstrate how the extension advises third parties of progress according to the terms of the user's support agreement.
- Explain and demonstrate how the extension records additional information on unresolved identified problems to be forwarded to appropriate area to resolve.

### **7.11 Topic 11: Problem solving strategies**

#### **7.11.1 Subject Outcome 1:** Define and analyse the problem

##### **Learning Outcomes**

The student should be able to:

- Examine, identify and define the problem in terms of problem type, problem parameters, and possible causes.
- Identify and ensure that the facts collected meet the problem requirements.
- Identify problem components to determine possible courses of action.
- Analyse the problem for cross-cultural implications.

#### **7.11.2 Subject Outcome 2:** Evaluate solutions

##### **Learning Outcomes**

The student should be able to:

- Identify possible solutions to the problem using a range of problem solving techniques.
- Identify criteria for evaluating solutions to match the type of problem.
- Evaluate possible solutions against established criteria.
- Evaluate that the solutions selected meet established criteria and problem requirements.

#### **7.11.3 Subject Outcome 3:** Implement the solution

##### **Learning Outcomes**

The student should be able to:

- Explain and ensure that solutions are trailed and/or monitored for effectiveness of problem solution.
- Explain and ensure that the solutions implemented are reviewed and modified, and practices are standardised where required.
- Ensure that stakeholders are consulted during implementation.

## **7.12 Topic 12: Repairs on PC or handheld computer and peripherals to module level**

### **7.12.1 Subject Outcome 1: Diagnose faults with a personal computer**

#### **Learning Outcomes**

The student should be able to:

- Explain and demonstrate how the diagnosis of each fault verifies the reported symptoms, and identifies any further symptoms.
- Explain and demonstrate how the diagnosis identifies the causes of the symptoms, using diagnostic procedures recommended by industry, and according to the user's requirements.
- Explain and demonstrate how the diagnosis identifies known problems using information sources.
- Explain and demonstrate how the diagnosis identifies hardware faults to module level, and software faults to packaged software level.

### **7.12.2 Subject Outcome 2: Plan the repair of a personal computer to module level**

#### **Learning Outcomes**

The student should be able to:

- Outline how the plan reviews the diagnosis and how it explains the feasibility of the repair.
- Explain how the plan outlines the strategy for repairing the fault.
- Briefly explain (step by step) how the plan adopts a review procedure which ensures that the final outcome meets user requirements.
- Explain how the plan estimates the effort, duration and resources required for the repair.
- Explain how the plan ensures that the resources required to complete the repair are available at the repair site.
- Explain how the plan ensures that the replacement modules and software are compatible with the computer system, and carry evidence of integrity.

### **7.12.3 Subject Outcome 3: Replace faulty modules in a personal computer**

#### **Learning Outcomes**

The student should be able to:

- Explain and demonstrate how the replacement modules are installed according to manufacturer's specifications.
- Explain and demonstrate how the replacement ensures that modules function according to manufacturer's specification, by carrying out appropriate tests.
- Explain and demonstrate how the replacement ensures that the personal computer operates according to hardware and software manufacturer's specification.

### **7.12.4 Subject Outcome 4: Resolve faulty software in a personal computer**

#### **Learning Outcomes**

The student should be able to:

- Explain and demonstrate how the resolution ensures that the personal computer software problem is resolved by following the publisher's instructions.
- Explain and demonstrate how the resolution ensures that the personal computer hardware and software operates according to the publisher's specification.
- Explain how the resolution minimises disruption to the user.

### **7.12.5 Subject Outcome 5: Restore a personal computer to service**

#### **Learning Outcomes**

The student should be able to:

- Explain and demonstrate how the restoration ensures that the personal computer user's data and configuration are restored according to the repair plan.
- Explain and demonstrate how the restoration ensures that the personal computer is available to the user.

## **8 RESOURCE NEEDS FOR THE TEACHING OF COMPUTER HARDWARE & SOFTWARE – LEVEL 3**

### **8.1 Physical resources**

The following teaching aids should be made available, if possible

- Lecture room
- Computer laboratory (with hardware)

### **8.2 Human resources**

- The facilitator must have a technical support related qualification specialising in hardware and software Level 5.
- It will be an advantage if the facilitator has declared competence as assessor and/or moderator.
- Training in OBE

### **8.3 Other resources**

- File per learner for PoE
- Technicians toolkit
- Job card booklet
- Computer components eg: Motherboards, RAM, HDD, stiffy drives, sound cards, network cards, power cables etc.
- DVD-RW