

TRAINING REGULATIONS



COMPUTER HARDWARE SERVICING NC II

**INFORMATION AND COMMUNICATION
TECHNOLOGY (ICT) SECTOR**

TECHNICAL EDUCATION AND SKILLS DEVELOPMENT AUTHORITY
East Service Road, South Superhighway, Taguig City, Metro Manila

TABLE OF CONTENTS

ICT SECTOR

COMPUTER HARDWARE SERVICING NC II

	Page No.
Section 1. COMPUTER HARDWARE SERVICING NC II QUALIFICATION	1
Section 2. COMPETENCY STANDARDS	2 – 41
• Basic Competencies	2 – 15
• Common Competencies	16 - 35
• Core Competencies	36 - 53
Section 3. TRAINING STANDARDS	54 – 63
3.1 Curriculum Design	54 - 59
3.2 Training Delivery	60
3.3 Trainee Entry Requirements	61
3.4 List of Tools, Equipment and Materials	61 - 62
3.5 Training Facilities	63
3.6 Trainer's Qualifications	63
3.7 Institutional Assessment	63
Section 4. NATIONAL ASSESSMENT AND CERTIFICATION ARRANGEMENTS	64
COMPETENCY MAP	65
GLOSSARY OF TERMS	66 - 67
ACKNOWLEDGEMENTS	

TRAINING REGULATIONS FOR COMPUTER HARDWARE SERVICING NC II

Section 1 COMPUTER HARDWARE SERVICING NC II QUALIFICATIONS

The **COMPUTER HARDWARE SERVICING NC II** Qualification consists of competencies that must possess to enable to diagnose and troubleshoot problems in personal computer systems, software, replace parts and get the system back to normal operation.

This Qualification is packaged from the competency map of the Information and Communication Technology (ICT) Industry as shown in Annex A.

The units of competency comprising this qualification includes the following:

Code	BASIC COMPETENCIES
500311105	Participate in workplace communication
500311106	Work in a team environment
500311107	Practice career professionalism
500311108	Practice occupational health and safety procedures

CODE	COMMON COMPETENCIES
ICT315202	Apply quality standards
ICT311201	Perform computer operations
ELC311201	Perform mensuration and calculation
ELC311202	Prepare and interpret technical drawing
ELC724201	Use hand tools
ELC724202	Terminate and connect electrical wiring and electronic circuits

CODE	CORE COMPETENCIES
ELC724318	Install computer systems and networks
ELC724319	Diagnose and troubleshoot computer systems
ELC724320	Configure computer systems and networks
ELC724321	Maintain computer systems and networks

A person who has achieved this Qualification is competent to be:

- **Computer Service Technician**
- **Computer Repairman**

SECTION 2 COMPETENCY STANDARDS

This section gives the details of the contents of the core units of competency required for **COMPUTER HARDWARE SERVICING NC II**.

BASIC COMPETENCIES

UNIT OF COMPETENCY : PARTICIPATE IN WORKPLACE COMMUNICATION

UNIT CODE : 500311105

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to gather, interpret and convey information in response to workplace requirements.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables
1. Obtain and convey workplace information	1.1 Specific and relevant information is accessed from <i>appropriate sources</i> 1.2 Effective questioning, active listening and speaking skills are used to gather and convey information 1.3 Appropriate <i>medium</i> is used to transfer information and ideas 1.4 Appropriate non- verbal communication is used 1.5 Appropriate lines of communication with supervisors and colleagues are identified and followed 1.6 Defined workplace procedures for the location and <i>storage</i> of information are used 1.7 Personal interaction is carried out clearly and concisely
2. Participate in workplace meetings and discussions	2.1 Team meetings are attended on time 2.2 Own opinions are clearly expressed and those of others are listened to without interruption 2.3 Meeting inputs are consistent with the meeting purpose and established <i>protocols</i> 2.4 <i>Workplace interactions</i> are conducted in a courteous manner 2.5 Questions about simple routine workplace procedures and matters concerning working conditions of employment are asked and responded to 2.6 Meetings outcomes are interpreted and implemented
3. Complete relevant work related documents	3.1 Range of <i>forms</i> relating to conditions of employment are completed accurately and legibly 3.2 Workplace data is recorded on standard workplace forms and documents 3.3 Basic mathematical processes are used for routine calculations 3.4 Errors in recording information on forms/ documents are identified and properly acted upon 3.5 Reporting requirements to supervisor are completed according to organizational guidelines

RANGE OF VARIABLES

VARIABLE	RANGE
1. Appropriate sources	1.1. Team members 1.2. Suppliers 1.3. Trade personnel 1.4. Local government 1.5. Industry bodies
2. Medium	2.1. Memorandum 2.2. Circular 2.3. Notice 2.4. Information discussion 2.5. Follow-up or verbal instructions 2.6. Face to face communication
3. Storage	3.1. Manual filing system 3.2. Computer-based filing system
4. Forms	4.1. Personnel forms, telephone message forms, safety reports
5. Workplace interactions	5.1. Face to face 5.2. Telephone 5.3. Electronic and two way radio 5.4. Written including electronic, memos, instruction and forms, non-verbal including gestures, signals, signs and diagrams
6. Protocols	6.1. Observing meeting 6.2. Compliance with meeting decisions 6.3. Obeying meeting instructions

EVIDENCE GUIDE

<p>1. Critical Aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1. Prepared written communication following standard format of the organization 1.2. Accessed information using communication equipment 1.3. Made use of relevant terms as an aid to transfer information effectively 1.4. Conveyed information effectively adopting the formal or informal communication
<p>2. Underpinning Knowledge and Attitudes</p>	<ul style="list-style-type: none"> 2.1. Effective communication 2.2. Different modes of communication 2.3. Written communication 2.4. Organizational policies 2.5. Communication procedures and systems 2.6. Technology relevant to the enterprise and the individual's work responsibilities
<p>3. Underpinning Skills</p>	<ul style="list-style-type: none"> 3.1. Follow simple spoken language 3.2. Perform routine workplace duties following simple written notices 3.3. Participate in workplace meetings and discussions 3.4. Complete work related documents 3.5. Estimate, calculate and record routine workplace measures 3.6. Basic mathematical processes of addition, subtraction, division and multiplication 3.7. Ability to relate to people of social range in the workplace 3.8. Gather and provide information in response to workplace Requirements
<p>4. Resource Implications</p>	<ul style="list-style-type: none"> 4.1. Fax machine 4.2. Telephone 4.3. Writing materials 4.4. Internet
<p>5. Methods of Assessment</p>	<ul style="list-style-type: none"> 5.1. Direct Observation 5.2. Oral interview and written test
<p>6. Context of Assessment</p>	<ul style="list-style-type: none"> 6.1. Competency may be assessed individually in the actual workplace or through accredited institution

UNIT OF COMPETENCY: WORK IN TEAM ENVIRONMENT

UNIT CODE : 500311106

UNIT DESCRIPTOR : This unit covers the skills, knowledge and attitudes to identify role and responsibility as a member of a team.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables
1. Describe team role and scope	1.1. The <i>role and objective of the team</i> is identified from available <i>sources of information</i> 1.2. Team parameters, reporting relationships and responsibilities are identified from team discussions and appropriate external sources
2. Identify own role and responsibility within team	2.1. Individual role and responsibilities within the team environment are identified 2.2. Roles and responsibility of other team members are identified and recognized 2.3. Reporting relationships within team and external to team are identified
3. Work as a team member	3.1. Effective and appropriate forms of communications used and interactions undertaken with team members who contribute to known team activities and objectives 3.2. Effective and appropriate contributions made to complement team activities and objectives, based on individual skills and competencies and <i>workplace context</i> 3.3. Observed protocols in reporting using standard operating procedures 3.4. Contribute to the development of team work plans based on an understanding of team's role and objectives and individual competencies of the members.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Role and objective of team	1.1. Work activities in a team environment with enterprise or specific sector 1.2. Limited discretion, initiative and judgement maybe demonstrated on the job, either individually or in a team environment
2. Sources of information	2.1. Standard operating and/or other workplace procedures 2.2. Job procedures 2.3. Machine/equipment manufacturer's specifications and instructions 2.4. Organizational or external personnel 2.5. Client/supplier instructions 2.6. Quality standards 2.7. OHS and environmental standards
3. Workplace context	3.1. Work procedures and practices 3.2. Conditions of work environments 3.3. Legislation and industrial agreements 3.4. Standard work practice including the storage, safe handling and disposal of chemicals 3.5. Safety, environmental, housekeeping and quality guidelines

EVIDENCE GUIDE

<p>1. Critical aspects of competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1. Operated in a team to complete workplace activity 1.2. Worked effectively with others 1.3. Conveyed information in written or oral form 1.4. Selected and used appropriate workplace language 1.5. Followed designated work plan for the job 1.6. Reported outcomes
<p>2. Underpinning Knowledge and Attitude</p>	<ul style="list-style-type: none"> 2.1. Communication process 2.2. Team structure 2.3. Team roles 2.4. Group planning and decision making
<p>3. Underpinning Skills</p>	<ul style="list-style-type: none"> 3.1. Communicate appropriately, consistent with the culture of the workplace
<p>4. Resource Implications</p>	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> 4.1. Access to relevant workplace or appropriately simulated environment where assessment can take place 4.2. Materials relevant to the proposed activity or tasks
<p>5. Methods of Assessment</p>	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 5.1. Observation of the individual member in relation to the work activities of the group 5.2. Observation of simulation and or role play involving the participation of individual member to the attainment of organizational goal 5.3. Case studies and scenarios as a basis for discussion of issues and strategies in teamwork
<p>6. Context for Assessment</p>	<ul style="list-style-type: none"> 6.1. Competency may be assessed in workplace or in a simulated workplace setting 6.2. Assessment shall be observed while task are being undertaken whether individually or in group

UNIT OF COMPETENCY: PRACTICE CAREER PROFESSIONALISM

UNIT CODE : 500311107

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes in promoting career growth and advancement.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables
1. Integrate personal objectives with organizational goals	1.1 Personal growth and work plans are pursued towards improving the qualifications set for the profession 1.2 Intra- and interpersonal relationships is are maintained in the course of managing oneself based on performance evaluation 1.3 Commitment to the organization and its goal is demonstrated in the performance of duties
1. Set and meet work priorities	2.1 Competing demands are prioritized to achieve personal, team and organizational goals and objectives. 2.2 Resources are utilized efficiently and effectively to manage work priorities and commitments 2.3 Practices along economic use and maintenance of equipment and facilities are followed as per established procedures
2. Maintain professional growth and development	3.1 Trainings and career opportunities are identified and availed of based on job requirements 3.2 Recognitions are -sought/received and demonstrated as proof of career advancement 3.3 Licenses and/or certifications relevant to job and career are obtained and renewed-

RANGE OF VARIABLES

VARIABLE	RANGE
1. Evaluation	1.1 Performance Appraisal 1.2 Psychological Profile 1.3 Aptitude Tests
2. Resources	2.1 Human 2.2 Financial 2.3 Technology 2.3.1 Hardware 2.3.2 Software
3. Trainings and career opportunities	3.1 Participation in training programs 3.1.1 Technical 3.1.2 Supervisory 3.1.3 Managerial 3.1.4 Continuing Education 3.2 Serving as Resource Persons in conferences and workshops
4. Recognitions	4.1 Recommendations 4.2 Citations 4.3 Certificate of Appreciations 4.4 Commendations 4.5 Awards 4.6 Tangible and Intangible Rewards
5. Licenses and/or certifications	5.1 National Certificates 5.2 Certificate of Competency 5.3 Support Level Licenses 5.4 Professional Licenses

EVIDENCE GUIDE

<p>1. Critical Aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Attained job targets within key result areas (KRAs) 1.2 Maintained intra - and interpersonal relationship in the course of managing oneself based on performance evaluation 1.3 Completed trainings and career opportunities which are based on the requirements of the industries 1.4 Acquired and maintained licenses and/or certifications according to the requirement of the qualification
<p>2. Underpinning Knowledge</p>	<ul style="list-style-type: none"> 2.1 Work values and ethics (Code of Conduct, Code of Ethics, etc.) 2.2 Company policies 2.3 Company-operations, procedures and standards 2.4 Fundamental rights at work including gender sensitivity 2.5 Personal hygiene practices
<p>3. Underpinning Skills</p>	<ul style="list-style-type: none"> 3.1 Appropriate practice of personal hygiene 3.2 Intra and Interpersonal skills 3.3 Communication skills
<p>4. Resource Implications</p>	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> 4.1 Workplace or assessment location 4.2 Case studies/scenarios
<p>5. Methods of Assessment</p>	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 5.1 Portfolio Assessment 5.2 Interview 5.3 Simulation/Role-plays 5.4 Observation 5.5 Third Party Reports 5.6 Exams and Tests
<p>6. Context of Assessment</p>	<ul style="list-style-type: none"> 6.1 Competency may be assessed in the work place or in a simulated work place setting

UNIT OF COMPETENCY : PRACTICE OCCUPATIONAL HEALTH AND SAFETY PROCEDURES

UNIT CODE : 500311108

UNIT DESCRIPTOR : This unit covers the outcomes required to comply with regulatory and organizational requirements for occupational health and safety.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables
1. Identify hazards and risks	1.1 Safety regulations and workplace safety and hazard control practices and procedures are clarified and explained based on organization procedures 1.2 Hazards/risks in the workplace and their corresponding indicators are identified to minimize or eliminate risk to co-workers, workplace and environment in accordance with organization procedures 1.3 Contingency measures during workplace accidents, fire and other emergencies are recognized and established in accordance with organization procedures
2. Evaluate hazards and risks	2.1 Terms of maximum tolerable limits which when exceeded will result in harm or damage are identified based on threshold limit values (TLV) 2.2 Effects of the hazards are determined 2.3 OHS issues and/or concerns and identified safety hazards are reported to designated personnel in accordance with workplace requirements and relevant workplace OHS legislation

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables
3. Control hazards and risks	3.1 Occupational Health and Safety (OHS) procedures for controlling hazards/risks in workplace are consistently followed 3.2 Procedures for dealing with workplace accidents, fire and emergencies are followed in accordance with organization OHS policies 3.3 Personal protective equipment (PPE) is correctly used in accordance with organization OHS procedures and practices 3.4 Appropriate assistance is provided in the event of a workplace emergency in accordance with established organization protocol
4. Maintain OHS awareness	4.1 Emergency-related drills and trainings are participated in as per established organization guidelines and procedures 4.2 OHS personal records are completed and updated in accordance with workplace requirements

RANGE OF VARIABLES

VARIABLE	RANGE
1. Safety regulations	May include but are not limited to: 1.1 Clean Air Act 1.2 Building code 1.3 National Electrical and Fire Safety Codes 1.4 Waste management statutes and rules 1.5 Philippine Occupational Safety and Health Standards 1.6 DOLE regulations on safety legal requirements 1.7 ECC regulations
2. Hazards/Risks	May include but are not limited to: 2.1 Physical hazards – impact, illumination, pressure, noise, vibration, temperature, radiation 2.2 Biological hazards- bacteria, viruses, plants, parasites, mites, molds, fungi, insects 2.3 Chemical hazards – dusts, fibers, mists, fumes, smoke, gasses, vapors 2.4 Ergonomics 2.4.1 Psychological factors – over exertion/ excessive force, awkward/static positions, fatigue, direct pressure, varying metabolic cycles 2.4.2 Physiological factors – monotony, personal relationship, work out cycle
3. Contingency measures	May include but are not limited to: 3.1 Evacuation 3.2 Isolation 3.3 Decontamination 3.4 Calling emergency personnel
4. PPE	May include but are not limited to: 4.1 Mask 4.2 Gloves 4.3 Goggles 4.4 Hair Net/cap/bonnet 4.5 Face mask/shield 4.6 Ear muffs 4.7 Apron/Gown/coverall/jump suit 4.8 Anti-static suits

VARIABLE	RANGE
5. Emergency-related drills and training	5.1 Fire drill 5.2 Earthquake drill 5.3 Basic life support/CPR 5.4 First aid 5.5 Spillage control 5.6 Decontamination of chemical and toxic 5.7 Disaster preparedness/management
6. OHS personal records	6.1 Medical/Health records 6.2 Incident reports 6.3 Accident reports 6.4 OHS-related training completed

EVIDENCE GUIDE

<p>1. Critical Aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Explained clearly established workplace safety and hazard control practices and procedures 1.2 Identified hazards/risks in the workplace and its corresponding indicators in accordance with company procedures 1.3 Recognized contingency measures during workplace accidents, fire and other emergencies 1.4 Identified terms of maximum tolerable limits based on threshold limit value- TLV. 1.5 Followed Occupational Health and Safety (OHS) procedures for controlling hazards/risks in workplace 1.6 Used Personal Protective Equipment (PPE) in accordance with company OHS procedures and practices 1.7 Completed and updated OHS personal records in accordance with workplace requirements
<p>2. Underpinning Knowledge and Attitude</p>	<ul style="list-style-type: none"> 2.1 OHS procedures and practices and regulations 2.2 PPE types and uses 2.3 Personal hygiene practices 2.4 Hazards/risks identification and control 2.5 Threshold Limit Value -TLV 2.6 OHS indicators 2.7 Organization safety and health protocol 2.8 Safety consciousness 2.9 Health consciousness
<p>3. Underpinning Skills</p>	<ul style="list-style-type: none"> 3.1 Practice of personal hygiene 3.2 Hazards/risks identification and control skills 3.3 Interpersonal skills 3.4 Communication skills
<p>3. Resource Implications</p>	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> 4.1 Workplace or assessment location 4.2 OHS personal records 4.3 PPE 4.4 Health records
<p>4. Methods of Assessment</p>	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 5.1 Portfolio Assessment 5.2 Interview 5.3 Case Study/Situation
<p>5. Context for Assessment</p>	<ul style="list-style-type: none"> 6.1 Competency may be assessed in the work place or in a simulated work place setting

COMMON COMPETENCIES

UNIT TITLE : **APPLY QUALITY STANDARDS**

UNIT CODE : **506315202**

UNIT DESCRIPTOR : This unit covers the knowledge, skills, attitudes and values needed to apply quality standards in the workplace. The unit also includes the application of relevant safety procedures and regulations, organization procedures and customer requirements.

ELEMENTS	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables
1. Assess quality of received materials	1.1. Work instruction is obtained and work is carried out in accordance with standard operating procedures. 1.2. Received materials are checked against workplace standards and specifications. 1.3. Faulty materials related to work are identified and isolated. 1.4. Faults and any identified causes are recorded and/or reported to the supervisor concerned in accordance with workplace procedures. 1.5. Faulty materials are replaced in accordance with workplace procedures.
2. Assess own work	2.1. Documentation relative to quality within the company is identified and used. 2.2. Completed work is checked against workplace standards relevant to the task undertaken. 2.3. Errors are identified and isolated. 2.4. Information on the quality and other indicators of production performance are recorded in accordance with workplace procedures. 2.5. In cases of deviations from specific quality standards , causes are documented and reported in accordance with the workplace's standards operating procedures.
3. Engage in quality improvement	3.1. Process improvement procedures are participated in relative to workplace assignment. 3.2. Work is carried out in accordance with process improvement procedures. 3.3. Performance of operation or quality of product of service to ensure customer satisfaction is monitored.

RANGE OF VARIABLES

VARIABLE	RANGE
1 Materials	1.1 Materials may include but not limited to: 1.1.1. Manuals 1.1.2. Job orders 1.1.3. Instructional videos
2 Faults	2.1 Faults may include but not limited to: 2.1.1. Materials not to specification 2.1.2. Materials contain incorrect/outdated information 2.1.3. Hardware defects 2.1.4. Materials that do not conform with any regulatory agencies
3 Documentation	3.1 Organization work procedures 3.2 Manufacturer's instruction manual 3.3 Customer requirements 3.4 Forms
4 Errors	4.1 Errors may be related but not limited to the following: 4.1.1. Deviation from the requirements of the Client 4.1.2. Deviation from the requirement of the organization
5 Quality standards	5.1 Quality standards may be related but not limited to the following: 5.1.1. Materials 5.1.2. Hardware 5.1.3. Final product 5.1.4. Production processes 5.1.5. Customer service
6 Customer	6.1 Co-worker 6.2 Supplier/Vendor 6.3 Client 6.4 Organization receiving the product or service

EVIDENCE GUIDE

<p>1 Critical aspect of competency</p>	<p>Assessment must show that the candidate:</p> <ul style="list-style-type: none"> 1.1 Carried out work in accordance with the company's standard operating procedures 1.2 Performed task according to specifications 1.3 Reported defects detected in accordance with standard operating procedures 1.4 Carried out work in accordance with the process improvement procedures
<p>2 Underpinning knowledge</p>	<ul style="list-style-type: none"> 2.1 Relevant production processes, materials and products 2.2 Characteristics of materials, software and hardware used in production processes 2.3 Quality checking procedures 2.4 Workplace procedures 2.5 Safety and environmental aspects of production processes 2.6 Fault identification and reporting 2.7 Quality improvement processes
<p>3 Underpinning skills</p>	<ul style="list-style-type: none"> 3.1 Reading skills required to interpret work instruction 3.2 Communication skills needed to interpret and apply defined work procedures 3.3 Carry out work in accordance with OHS policies and procedures 3.4 Critical thinking 3.5 Solution providing and decision-making
<p>4 Method of assessment</p>	<p>The assessor must select two of the following to objectively evaluate the candidate:</p> <ul style="list-style-type: none"> 4.1 Observation and oral questioning 4.2 Third party report 4.3 Portfolio 4.4 Practical demonstration
<p>5 Resource implication</p>	<p>Materials, software and hardware to be used in a real or simulated situation</p>
<p>6 Context of Assessment</p>	<p>Assessment may be conducted in the workplace or in a simulated environment</p>

UNIT TITLE : PERFORM COMPUTER OPERATIONS

UNIT CODE : 506311203

UNIT DESCRIPTOR : This unit covers the knowledge, skills, attitudes and values needed to perform computer operations which include inputting, accessing, producing and transferring data using the appropriate hardware and software.

ELEMENTS	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables
1. Plan and prepare for task to be taken undertaken	1.1. Requirements of task are determined in accordance with the required output. 1.2. Appropriate hardware and software are selected according to task assigned and required outcome. 1.3. Task is planned to ensure that OH & S guidelines and procedures are followed. 1.4. Client -specific guidelines and procedures are followed. 1.5. Required data security guidelines are applied in accordance with existing procedures.
2. Input data into computer	2.1. Data are entered into the computer using appropriate program/application in accordance with company procedures. 2.2. Accuracy of information is checked and information is saved in accordance with standard operating procedures. 2.3. Inputted data is stored in storage media according to requirements. 2.4. Work is performed within ergonomic guidelines .
3. Access information using computer	3.1. Correct program/application is selected based on job requirements. 3.2. Program/application containing the information required is accessed according to company procedures. 3.3. Desktop icons are correctly selected, opened and closed for navigation purposes. 3.4. Keyboard techniques are carried out in line with OH & S requirements for safe use of keyboards.

<p>4. Produce output/ data using computer system</p>	<p>4.1. Entered data are processed using appropriate software commands.</p> <p>4.2. Data are printed out as required using computer hardware /peripheral devices in accordance with standard operating procedures.</p> <p>4.3. Files and data are transferred between compatible systems using computer software, hardware/peripheral devices in accordance with standard operating procedures.</p>
<p>5. Use basic functions of a www-browser to locate information</p>	<p>5.1. Information requirements for internet search are established.</p> <p>5.2. Browser is launched.</p> <p>5.3. Search engine is loaded.</p> <p>5.4. Appropriate search criteria/or URL of site is entered.</p> <p>5.5. Relevant links are followed to locate required information.</p> <p>5.6. Useful pages are bookmarked or printed as required.</p>
<p>6. Maintain computer equipment and systems</p>	<p>6.1. Procedures for ensuring security of data, including regular back-ups and virus checks are implemented in accordance with standard operating procedures.</p> <p>6.2. Basic file maintenance procedures are implemented in line with the standards operating procedures.</p>

RANGE OF VARIABLES

VARIABLE	RANGE
1 Hardware and peripheral devices	1.1 Personal computers 1.2 Networked systems 1.3 Communication equipment 1.4 Printers 1.5 Scanners 1.6 Keyboard 1.7 Mouse 1.8 Voice/Data logger
2 Software	Software includes the following but not limited to: 2.1 Word processing packages 2.2 Database packages 2.3 Internet 2.4 Spreadsheets 2.5 Client Specific Software
3 OH & S guidelines	3.1 OHS guidelines 3.2 Enterprise procedures
4 Storage media	Storage media include the following but not limited to: 4.1 Diskettes 4.2 CDs 4.3 Zip disks 4.4 hard disk drives, local and remote 4.5 Optical drives
5 Ergonomic guidelines	5.1 Types of equipment used 5.2 Appropriate furniture 5.3 Seating posture 5.4 Lifting posture 5.5 Visual display unit screen brightness

6 Desktop icons	6.1 Icons include the following but not limited to: 6.2 Directories/folders 6.3 Files 6.4 Network devices 6.5 Recycle bin 6.6 Program icons
7 Maintenance	7.1 Creating and managing more space in the hard disk and other peripherals 7.2 Reviewing programs 7.3 Deleting unwanted files 7.4 Backing up files 7.5 Checking hard drive for errors 7.6 Using up to date anti-virus programs 7.7 Cleaning dust from internal and external surfaces

EVIDENCE GUIDE

<p>1 Critical aspects of competency</p>	<p>Assessment must show that the candidate:</p> <ul style="list-style-type: none"> 1.1 Selected and used hardware components correctly and according to the task requirement 1.2 used basic software applications to create new files and documents 1.3 Produced accurate and complete data in accordance with the requirements 1.4 Used appropriate devices and procedures to transfer files/data accurately 1.5 Used basic functions of a www-browser to locate information.
<p>2 Underpinning knowledge</p>	<ul style="list-style-type: none"> 2.1 Basic ergonomics of keyboard and computer user 2.2 Main types of computers and basic features of different operating systems 2.3 Main parts of a computer 2.4 Storage devices and basic categories of memory 2.5 Relevant types of software 2.6 General security, privacy legislation and copyright 2.7 Viruses 2.8 OH & S principles and responsibilities 2.9 Calculating computer capacity 2.10 Productivity Application 2.11 Business Application 2.12 System Software
<p>3 Underpinning skills</p>	<ul style="list-style-type: none"> 3.1 Reading and comprehension skills required to interpret work instruction and to interpret basic user manuals. 3.2 Communication skills to identify lines of communication, request advice, follow instructions and receive feedback. 3.3 Technology skills to use equipment safely including keyboard skills.
<p>4 Method of assessment</p>	<p>The assessor may select two of the following assessment methods to objectively assess the candidate:</p> <ul style="list-style-type: none"> 4.1 Direct Observation and Oral Questioning 4.2 Practical demonstration
<p>5 Resource implication</p>	<ul style="list-style-type: none"> 5.1 Computer hardware with peripherals 5.2 Appropriate software
<p>6 Context of Assessment</p>	<p>Assessment may be conducted in the workplace or in a simulated environment</p>

UNIT TITLE : **PERFORM MENSURATION AND CALCULATION**
UNIT CODE : **ELC311201**
UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes and values needed identify, care, handle and use measuring instruments

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables
1. Select measuring instruments	1.1. Object or component to be measured is identified 1.2. Correct specifications are obtained from relevant source 1.3. Measuring tools are selected in line with job requirements
2. Carry out measurements and calculation	2.1. Appropriate measuring instrument is selected to achieve required outcome 2.2. Accurate measurements are obtained for job 2.3. Calculation needed to complete work tasks are performed using the four basic process of addition (+), subtraction (-), multiplication (x), and division (/) 2.4. Calculation involving fractions, percentages and mixed numbers are used to complete workplace tasks. 2.5. Numerical computation is self-checked and corrected for accuracy 2.6. Instruments are read to the limit of accuracy of the tool.
3. Maintain measuring instruments	3.1. Measuring instruments are not dropped to avoid damage 3.2. Measuring instruments are cleaned before and after using. 3.3. Proper storage of instruments undertaken according to manufacturer's specifications and standard operating procedures.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Measuring instruments	1.1. Straight edge 1.2. Torque gauge 1.3. Try square 1.4. Protractor 1.5. Combination gauge 1.6. Steel rule
2. Calculation	Kinds of part mensuration includes the following but not limited to 2.1. Volume 2.2. Area 2.3. Displacement 2.4. Inside diameter 2.5. Circumference 2.6. Length 2.7. Thickness 2.8. Outside diameter 2.9. Taper 2.10. Out of roundness

EVIDENCE GUIDE

1. Critical aspect of competency	<p>Assessment must show that the candidate:</p> <ul style="list-style-type: none"> 1.1. selected proper measuring instruments according to tasks 1.2. carried out measurement and calculations 1.3. maintained and stores instruments
2. Underpinning knowledge	<ul style="list-style-type: none"> 2.1. Types of measuring instruments and their uses 2.2. Safe handling procedures in using measuring instruments 2.3. Four fundamental operation of mathematics 2.4. Formula for volume, area, perimeter and other geometric figures
3. Underpinning skills	<ul style="list-style-type: none"> 3.1. Reading skills required to interpret work instruction 3.2. Communication skills 3.3. Handling measuring instruments 3.4. Performing mathematical calculations using the four fundamental operations 3.5. Visualizing objects and shapes 3.6. Interpreting formulae
4. Method of assessment	<p>Competency in this unit must be assessed through:</p> <ul style="list-style-type: none"> 4.1. Observation 4.2. Oral questioning
5. Resource implication	<ul style="list-style-type: none"> 5.1. Place of assessment 5.2. Measuring instruments 5.3. Straight edge 5.4. Torque gauge 5.5. Try square 5.6. Protractor 5.7. Combination gauge 5.8. Steel rule
6. Context of Assessment	<ul style="list-style-type: none"> 6.1 Assessment may be conducted in the workplace or in a simulated environment

UNIT TITLE : **PREPARE AND INTERPRET TECHNICAL DRAWING**
UNIT CODE : **ELC311202**
UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes and values needed to prepare/interpret diagrams, engineering abbreviation and drawings, symbols, dimension.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables
1. Identify different kinds of technical drawings	1.1. Correct technical drawing is selected according to job requirements. 1.2. Technical drawings are segregated in accordance with the types and kinds of drawings
2. Interpret technical drawing	2.1. Components, assemblies or objects are recognized as required. 2.2. Dimensions of the key features of the objects depicted in the drawing are correctly identified. 2.3. Symbols used in the drawing are identified and interpreted correctly. 2.4. Drawing is checked and validated against job requirements or equipment in accordance with standard operating procedures.
3. Prepare/make changes to electrical/electronic schematics and drawings	3.1. Electrical/electronic schematic is drawn and correctly identified. 3.2. Correct drawing is identified, equipment are selected and used in accordance with job requirements.
4. Store technical drawings and equipment /instruments	4.1. Care and maintenance of drawings are undertaken according to company procedures. 4.2. Technical drawings are recorded and inventory is prepared in accordance with company procedures. 4.3. Proper storage of instruments is undertaken according to company procedures.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Technical drawings	May include the following but not limited to: <ol style="list-style-type: none"> 1.1. Schematic diagrams 1.2. Charts 1.3. Block diagrams 1.4. Lay-out plans 1.5. Location plans 1.6. Process and instrumentation diagrams 1.7. Loop diagrams 1.8. System Control Diagrams
2. Dimensions	May include but not limited to: <ol style="list-style-type: none"> 2.1. Length 2.2. Width 2.3. Height 2.4. Diameter 2.5. Angles
3. Symbols	May include but not limited to: <ol style="list-style-type: none"> 3.1. NEC- National Electric Code 3.2. IEC -International Electrotechnical Commission 3.3. ASME - American Society of Mechanical Engineers 3.4. IEEE - Institute of Electrical and Electronics Engineers 3.5. ISA - Instrumentation System and Automation Society
4. Instruments/Equipment	<ol style="list-style-type: none"> 4.1. Components/dividers 4.2. Drawing boards 4.3. Rulers 4.4. T-square 4.5. Calculator

EVIDENCE GUIDE

<p>1. Critical aspect of competencies</p>	<p>Assessment must show that the candidate:</p> <ul style="list-style-type: none"> 1.1. selected correct technical drawing in line with job requirements 1.2. correctly identified the objects represented in the drawing 1.3. identified and interpreted symbols used in the drawing correctly 1.4. prepared/produced electrical/electronic drawings including all relevant specifications 1.5. stored diagrams/equipment
<p>2. Underpinning knowledge</p>	<ul style="list-style-type: none"> 2.1. Drawing conventions 2.2. Symbols 2.3. Dimensioning Conventions 2.4. Mark up/Notation of Drawings 2.5. Mathematics <ul style="list-style-type: none"> 2.5.1. Four fundamental operations 2.5.2. Percentage 2.5.3. Fraction 2.5.4. Trigonometric Functions 2.5.5. Algebra 2.5.6. Geometry
<p>3. Underpinning skills</p>	<ul style="list-style-type: none"> 3.1. Reading skills required to interpret work instruction 3.2. Communication skills 3.3. Interpreting electrical/electronic signs and symbols
<p>4. Method of assessment</p>	<p>Competency in this unit must be assessed through:</p> <ul style="list-style-type: none"> 4.1. Practical tasks involving interpretation of a range of technical drawings 4.2. Oral questioning
<p>5. Resource implication</p>	<ul style="list-style-type: none"> 5.1. Drawings 5.2. Diagrams 5.3. Charts 5.4. Plans
<p>6. Context of Assessment</p>	<ul style="list-style-type: none"> 6.1 Assessment may be conducted in the workplace or in a simulated environment

UNIT TITLE : **USE HAND TOOLS**
UNIT CODE : **ELC724201**
UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes on the safe use, handling and maintenance of tools.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables
1. Plan and prepare for tasks to be undertaken	1.1. Tasks to be undertaken are properly identified 1.2. Appropriate hand tools are identified and selected according to the task requirements
2. Prepare hand tools	2.1. Appropriate hand tools are checked for proper operation and safety 2.2. Unsafe or faulty tools are identified and marked for repair according to standard company procedure
3. Use appropriate hand tools and test equipment	3.1. Tools are used according to tasks undertaken 3.2. All safety procedures in using tools are observed at all times and appropriate personal protective equipment (PPE) are used 3.3. Malfunctions, unplanned or unusual events are reported to the supervisor
4. Maintain hand tools	4.1. Tools are not dropped to avoid damage 4.2. Routine maintenance of tools undertaken according to standard operational procedures, principles and techniques 4.3. Tools are stored safely in appropriate locations in accordance with manufacturer's specifications or standard operating procedures

RANGE OF VARIABLES

VARIABLE	RANGE
1. Hand tools	1.1. Hand tools for adjusting, dismantling, assembling, finishing, cutting. Tool set includes the following but not limited to: screw drivers, pliers, punches, wrenches, files
2. Personal Protective Equipment (PPE)	2.1. Gloves 2.2. Protective eyewear 2.3. Apron/overall
3. Maintenance	3.1. Cleaning 3.2. Lubricating 3.3. Tightening 3.4. Simple tool repairs 3.5. Hand sharpening 3.6. Adjustment using correct procedures

EVIDENCE GUIDE

1. Critical aspect of competency	<p>Assessment must show that the candidate:</p> <ol style="list-style-type: none"> 1.1. Demonstrated safe working practices at all times 1.2. Communicated information about processes, events or tasks being undertaken to ensure a safe and efficient working environment 1.3. Planned tasks in all situations and reviewed task requirements as appropriate 1.4. Performed all tasks to specification 1.5. Maintained and stored tools in appropriate location
2. Underpinning knowledge	<ol style="list-style-type: none"> 2.1. Safety <ol style="list-style-type: none"> 2.1.1. Safety requirements in handling tools 2.2. Tools : <ol style="list-style-type: none"> 2.2.1. Function, Operation, Common faults 2.3. Processes, Operations, Systems <ol style="list-style-type: none"> 2.3.1. Maintenance of tools 2.3.2. Storage of Tools
3. Underpinning skills	<ol style="list-style-type: none"> 3.1. Reading skills required to interpret work instruction and numerical skills 3.2. Communication skills 3.3. Problem solving in emergency situation
4. Method of assessment	<p>Competency in this unit must be assessed through:</p> <ol style="list-style-type: none"> 4.1. Observation 4.2. Oral questioning
5. Resource Implication	<ol style="list-style-type: none"> 5.1. Tools may include the following but not limited to: <ol style="list-style-type: none"> 5.1.1. screw drivers 5.1.2. pliers 5.1.3. punches 5.1.4. wrenches, files
6. Context of Assessment	<p>Assessment may be conducted in the workplace or in a simulated environment</p>

UNIT TITLE : **TERMINATE AND CONNECT ELECTRICAL WIRING AND ELECTRONICS CIRCUIT**
UNIT CODE : **ELC724202**
UNIT DESCRIPTOR : This unit covers the knowledge, skills, (and) attitudes and values needed to terminate and connect electrical wiring and electronic circuits

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables
1. Plan and prepare for termination/connection of electrical wiring/electronics circuits	1.1. Materials are checked according to specifications and tasks 1.2. Appropriate tools and equipment are selected according to tasks requirements 1.3. Task is planned to ensure OH & S guidelines and procedures are followed 1.4. Electrical wiring/electronic circuits are correctly prepared for connecting/termination in accordance with instructions and work site procedures
2. Terminate/connect electrical wiring/electronic circuits	2.1. Safety procedures in using tools are observed at all times and appropriate personal protective equipment are used 2.2. All work undertaken safely in accordance with the workplace and standard procedures 2.3. Appropriate range of methods in termination/connection are used according to specifications, manufacturer's requirements and safety 2.4. Correct sequence of operation is followed 2.5. Accessories used are adjusted, if necessary 2.6. Confirm termination/connection undertaken successfully in accordance with job specification
3. Test termination/connections of electrical wiring/electronics circuits	3.1. Testing of all completed termination/ connections of electric wiring/electronic circuits is conducted for compliance with specifications and regulations using appropriate procedures and equipment 3.2. Wiring and circuits are checked using specified testing procedures 3.3. Unplanned events or conditions are responded to in accordance with established procedures

RANGE OF VARIABLES

VARIABLE	RANGE
1. Materials	1.1 Materials included the following but not limited to: <ul style="list-style-type: none"> 1.1.1 Soldering lead 1.1.2 Cables 1.1.3 Wires
2. Tools and equipment	2.1 Tools for measuring, cutting, drilling, assembling/disassembling. Tool set includes the following but not limited to: <ul style="list-style-type: none"> 2.1.1 Pliers 2.1.2 Cutters 2.1.3 Screw drivers 2.2 Equipment <ul style="list-style-type: none"> 2.2.1 Soldering gun 2.2.2 Multi-tester
3. Personal protective equipment	3.1 goggles 3.2 gloves 3.3 apron/overall
4. Methods	4.1 Clamping 4.2 Pin connection 4.3 Soldered joints 4.4 Plugs
5. Accessories	5.1 Accessories may include the following but not limited to: <ul style="list-style-type: none"> 5.1.1 brackets 5.1.2 clamps

EVIDENCE GUIDE

<p>1. Critical aspect of competency</p>	<p>Assessment must show that the candidate:</p> <ul style="list-style-type: none"> 1.1. Undertook work safely and according to workplace and standard procedures 1.2. used appropriate termination/ connection methods 1.3. followed correct sequence in termination / connection process 1.4. conducted testing of terminated connected electrical wiring/electronic circuits using appropriate procedures and standards
<p>2. Underpinning knowledge</p>	<ul style="list-style-type: none"> 2.1. Use of tools 2.2. Use of test instruments/equipment 2.3. Electrical theory 2.4. Single phase AC principles 2.5. Wiring techniques 2.6. DC power supplies 2.7. Soldering
<p>3. Underpinning skills</p>	<ul style="list-style-type: none"> 3.1. Reading skills required to interpret work instruction 3.2. Communication skills 3.3. Soldering techniques
<p>4. Method of assessment</p>	<ul style="list-style-type: none"> 4.1. The assessor may select two (2) of the following assessment methods to objectively assess the candidate: <ul style="list-style-type: none"> 4.1.1. Observation 4.1.2. Oral Questioning 4.1.3. Practical demonstration
<p>5. Resource implication</p>	<ul style="list-style-type: none"> 5.1. Tools for measuring, cutting, drilling, assembling/disassembling, connecting. Tool set includes the following but not limited to: <ul style="list-style-type: none"> 5.1.1. screw drivers 5.1.2. pliers 5.1.3. cutters
<p>6. Context of Assessment</p>	<ul style="list-style-type: none"> 6.1. Assessment may be conducted in the workplace or in a simulated environment

CORE COMPETENCIES

UNIT TITLE : **INSTALL COMPUTER SYSTEMS AND NETWORKS**
 UNIT CODE : **ELC724318**
 UNIT DESCRIPTOR : This unit covers the outcomes required in installing, assembling and testing computers and common peripherals.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables
1 Plan and prepare for installation	1.1 Installation is planned and prepared to ensure <i>OH&S policies and procedures</i> are followed, the work is appropriately sequenced in accordance with <i>requirements</i> 1.2 <i>Appropriate personnel</i> are consulted to ensure the work is coordinated effectively with others involved on the work site 1.3 <i>Devices / systems</i> are obtained in accordance with established procedures and to comply with requirements 1.4 Location in which devices / systems are to be installed is determined from job requirements 1.5 Materials necessary to complete the work are obtained in accordance with established procedures and checked against job requirements 1.6 <i>Tools, equipment and testing devices</i> needed to carry out the installation work are obtained in accordance with established procedures and checked for correct operation and safety 1.7 Preparatory work is checked to ensure no unnecessary damage has occurred and complies with requirements

<p>2 Install equipment / device / system</p>	<p>2.1 OH&S policies and procedures for installing devices/systems are followed</p> <p>2.2 Devices / systems are installed in accordance with requirements, without damage or distortion to the surrounding environment or services</p> <p>2.3 Variation to devices / systems installation is carried out in accordance to customer/client requirements</p> <p>2.4 Devices / systems are terminated and connected in accordance with requirements</p> <p>2.5 Unplanned events or conditions are responded to in accordance with established procedures</p> <p>2.6 Approval is obtained in accordance with established procedures from appropriate personnel before any contingencies are implemented</p> <p>2.7 On-going checks of the quality of the work are undertaken in accordance with established procedures</p>
<p>3 Conduct test</p>	<p>3.1 OH&S policies and procedures are followed</p> <p>3.2 Circuits and systems are checked as being isolated where necessary using specified testing procedures</p> <p>3.3 Parts or connections of the installation or service that are removed in order to conduct the test are stored to protect against loss or damage and in accordance with established procedures</p> <p>3.4 Unplanned events or conditions are responded to in accordance with established procedures</p> <p>3.5 Approval is obtained in accordance with established procedures from appropriate personnel before any contingencies are implemented</p> <p>3.6 Devices / systems and/or installation is tested to determine whether it conforms to requirements</p> <p>3.7 Parts, and/or connections removed for the purpose of testing are returned to pre-test conditions in accordance with established procedures</p> <p>3.8 Final inspections are undertaken to ensure the installed devices / systems conforms to requirements</p> <p>3.9 Documentation in relation to the test is forwarded to appropriate personnel and/or authority in accordance with requirements</p>

RANGE OF VARIABLES

Variable	Range
1. OH&S policies and procedures	1.1 Occupational Health and Safety Laws 1.2 Personal Safety 1.3 Workplace Hazards 1.4 Environment Laws
2. Requirements	2.1 Job orders 2.2 Request forms 2.3 Report sheets
3. Devices / Systems	3.1 Personal computer systems and devices <ul style="list-style-type: none"> • Monitor • System unit and its components e.g., motherboard, power supply 3.2 Peripherals such as printers, scanners 3.3 Network devices and cabling such as hubs, switches, LAN cards
4. Appropriate personnel	4.1 Technical Supervisor 4.2 Client
5. Tools, equipment and testing devices	5.1 Protective eyewear 5.2 Digital multi-meter 5.3 Wire stripper with bolt cutter 5.4 Pliers (assorted) 5.5 Screw drivers (assorted) 5.6 Soldering iron 5.7 Desoldering tool 5.8 Allen wrench (0.05 – 0.25 inch) 5.9 Flashlight 5.10 IC insertion/extraction tool 5.11 Mirror (inspection) 5.12 RS 232 pin insertion/extraction tool 5.13 Sharp pointed tweezers 5.14 Antistatic wrist wrap 5.15 LAN Tester 5.16 Crimping tools
6. Testing procedures	6.1 Aging test 6.2 Substitution test

EVIDENCE GUIDE

<p>1. Critical aspects of competency</p>	<p>Assessment must show that the candidate:</p> <ol style="list-style-type: none"> 1.1. Installed the computer systems and networks in accordance with requirements, without damage or distortion to the surrounding environment or services 1.2. Tested the installed computer systems and network to determine whether it conforms to clients requirements 1.3. Conducted final inspections to ensure the installed devices / systems conforms to clients requirements
<p>2. Underpinning knowledge</p>	<ol style="list-style-type: none"> 2.1. Types of computers 2.2. Computer operating systems 2.3. Peripheral devices 2.4. Application packages & use of application programs 2.5. Multimedia systems 2.6. Motherboards 2.7. Multimedia storage devices: 2.8. Video cards 2.9. Sound cards 2.10. Computer PC hardware 2.11. Local area networks (LANs) 2.12. Graphical user interface 2.13. Use of utilities/software <ul style="list-style-type: none"> • Operating systems • Diagnostic software • Device drivers
<p>3 Underpinning skills</p>	<ol style="list-style-type: none"> 3.1 Cable troubleshooting 3.2 Problem solving skills 3.3 Decision making skills 3.4 Reading and writing skills
<p>4 Method of assessment</p>	<p>The assessor may select any two of the following assessment methods to objectively assess the candidate:</p> <ol style="list-style-type: none"> 4.1 Practical Demonstration w/ oral questioning 4.2 Interview 4.3 Third Party 4.4 Portfolio

5 Resource Implications	The following resources MUST be provided: 5.1 PC or workstation 5.2 Tools and test instruments 5.3 Appropriate software applications/programs
6 Context of Assessment	6.1 Assessment may be conducted in the workplace or in a simulated environment

UNIT TITLE : **CONFIGURE COMPUTER SYSTEMS AND NETWORKS**

UNIT CODE : **ELC724320**

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes needed to configure computer systems and networks.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> items are elaborated in the range of Variables
1. Plan and prepare for configuration	1.1. Computer systems and networks to be configured are identified from the Job/Service Order or instructions 1.2. Configuration is planned and prepared in line with job requirements. 1.3. OHS policies and procedures are followed in line with job requirements. 1.4. Computer systems and networks for configuration are checked against specifications and requirements. 1.5. Materials necessary to complete the work are obtained in accordance with established procedures and checked against job requirements. 1.6. Tools, equipment and testing devices needed for configuration of computer systems and networks are obtained and checked for correct operation and safety
2. Configure computer systems and networks	2.1. Appropriate personal protective equipment is used and OHS policies and procedures are followed 2.2. Normal function of systems and networks is checked in accordance with manufacturer's instructions 2.3. Fault or problem in the computer systems and networks is diagnosed in line with the standard operating procedures. 2.4. Computer systems and networks are configured in line with the standard operating procedures. 2.5. Unplanned events or conditions are responded to in accordance with established procedures
3. Inspect and test configured computer systems and networks	3.1. Final inspections are undertaken to ensure that the configuration done on the systems and networks conforms with the manufacturer's instruction/manual 3.2. Computer systems and networks are checked to ensure safe operation. 3.3. Report is prepared/completed according to company requirements.

RANGE OF VARIABLES

Variable	Range
1. OH & S policies and procedures	1.1. OH & S guidelines 1.2. Philippine environmental standards
2. Computer systems and networks	Includes but not limited to: 2.1. Servers 2.2. peripherals 2.3. desktop computers
3. Materials	Includes but not limited to: 3.1. Connectors 3.2. Adaptors 3.3. Wires and cables 3.4. Appropriate software 3.5. Computer storage media
4. Tools	Tools for: cutting, shaping, drilling, threading, tapping, finishing, dismantling, and assembling. Tool set includes but not limited to: 4.1. Pliers (assorted) 4.2. Screw drivers (assorted) 4.3. Soldering iron/gun 4.4. Wrenches
5. Equipment/testing devices	5.1. Equipment includes but not limited to: 5.1.1. Configurator 5.1.2. Computer 5.2. Testing devices includes but not limited to: 5.2.1. Multimeter 5.2.2. Calibrators 5.2.3. Signal generator 5.2.4. Oscilloscope
6. Personal protective equipment	Includes but not limited to: 6.1. Goggles/glasses 6.2. Safety apparel/suit 6.3. Mask 6.4. Gloves 6.5. Anti-static wrist wrap

EVIDENCE GUIDE

<p>1. Critical aspect of competency</p>	<p>Assessment must show that the candidate:</p> <ul style="list-style-type: none"> 1.1. Interpreted work instructions according to job requirements. 1.2. Diagnosed faults or problems on the systems and networks 1.3. Configured the identified systems and networks 1.4. Checked configured systems and networks to ensure safety 1.5. Documented the tasks undertaken
<p>2. Underpinning knowledge</p>	<p>Includes but not limited to:</p> <ul style="list-style-type: none"> 2.1. Occupational health and safety 2.2. IT hardwares 2.3. Use of tools 2.4. Mathematical calculations 2.5. Electrical theory 2.6. Electronics theory 2.7. Use of test equipment and calibrators 2.8. Wiring techniques 2.9. Drawing interpretation 2.10. Soldering techniques 2.11. Computer operations
<p>3. Underpinning skills</p>	<ul style="list-style-type: none"> 3.1. Reading skills required to interpret work instructions 3.2. Communication skills needed to interpret and define work procedures 3.3. Problem solving in emergency situation 3.4. Configuration procedures

4. Method of assessment	<p>4.1. The assessor may select two of the following assessment methods to objectively assess the candidate:</p> <ul style="list-style-type: none"> 4.1.1. Observation 4.1.2. Questioning 4.1.3. Third Party 4.1.4. Portfolio
5. Resource Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> 5.1. Tools 5.2. Test equipment/instruments 5.3. Materials 5.4. Personal Protective Equipment 5.5. Technical manuals
6. Context of Assessment	<p>6.1. Assessment may be conducted in the workplace or in a simulated environment</p>

UNIT TITLE : **DIAGNOSE AND TROUBLESHOOT COMPUTER SYSTEMS**

UNIT CODE : **ELC724321**

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes needed to diagnose computer systems and networks.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables
1. Plan and prepare for diagnosis of faults of computer systems	1.1. Diagnosis of faults is planned and prepared in line with job requirements 1.2. <i>OH & S policies and procedures</i> are followed in line with job requirements 1.3. Appropriate personnel are consulted to ensure that the work is effectively coordinated 1.4. <i>Materials</i> necessary to complete the work are obtained in accordance with established procedures and checked against job requirements 1.5. <i>Tools, equipment and testing devices</i> needed to carry out the work are obtained in accordance with established procedures and checked for proper operation and safety. 1.6. <i>Computer systems and networks</i> defects are checked against job requirements.
2. Diagnose faults of computer systems	2.1. Appropriate <i>personal protective equipment</i> is used in line with standard procedures. 2.2. Faults or problems in the computer systems and networks are diagnosed according to requirements and in line with the standard procedures. 2.3. Contingency measures are managed and implemented in accordance with established procedures 2.4. Unplanned events or conditions are responded to in accordance with established procedures

<p>3. Rectify/correct defects in computer systems and networks</p>	<p>3.1. Appropriate personal protective equipment is used in line with standard procedures.</p> <p>3.2. Defective components or parts are replaced or corrected without damage to the surrounding environment or services</p> <p>3.3. Adjustments, if necessary are made in accordance with established procedures</p> <p>3.4. Unplanned events or conditions are responded to in accordance with established procedures.</p>
<p>4. Test systems and networks</p>	<p>4.1. Computer systems and networks are tested to ensure safe operation.</p> <p>4.2. Unplanned events or conditions are responded to in accordance with established procedures.</p> <p>4.3. Report/s are prepared and completed according to company policy</p>

Range of Variables

Variable	Range
1. OH & S policies and procedures	1.1. OH & S guidelines 1.2. Philippine environmental standards
2. Computer systems and networks	Includes but not limited to: 2.1. servers 2.2. peripherals 2.3. desktop computers
3. Materials	Includes but not limited to: 3.1. Connectors 3.2. Adaptors 3.3. Wires and cables 3.4. Appropriate software 3.5. Computer storage media
4. Tools	Tools for: cutting, shaping, drilling, threading, tapping, finishing, dismantling, and assembling. Tool set includes but not limited to: 4.1. Pliers (assorted) 4.2. Screw drivers (assorted) 4.3. Soldering iron/gun 4.4. Wrenches
5. Testing devices	Testing devices includes but not limited to: 5.1. Multimeter 5.2. Calibrators 5.3. Signal generator 5.4. Oscilloscope 5.5. Appropriate software
6. Personal protective equipment	Includes but not limited to: 6.1. Goggles/glasses 6.2. Mask 6.3. Gloves 6.4. Anti-static wrist wrap

Evidence Guide

<p>1. Critical aspects of competency</p>	<p>Assessment must show that the candidate:</p> <ol style="list-style-type: none"> 1.1. Checked the computer systems and networks against job requirements 1.2. Correctly diagnosed the faults and problems in the computer systems and networks according to requirements and in line with the standard procedures 1.3. Corrected the defective components or parts of the computer systems and networks without damage to the surrounding environment or services 1.4. Tested the computer systems and networks to ensure safe operation.
<p>2. Underpinning knowledge</p>	<p>Includes but not limited to:</p> <ol style="list-style-type: none"> 2.1. Occupational Health and Safety 2.2. Use of tools 2.3. Electrical theory 2.4. Wiring techniques 2.5. Digital electronics 2.6. Microprocessor 2.7. Power supplies 2.8. Electronic fault findings 2.9. Graphical user interface 2.10. Data communications 2.11. Local Area Networks 2.12. Network Operating Systems 2.13. Application software 2.14. Computer monitors 2.15. Basic telephony 2.16. Control programming style 2.17. Microprocessor programming 2.18. Multimedia computer systems

3. Underpinning skills	3.1. Reading skills required to interpret work instructions 3.2. Communication skills needed to interpret and define work procedures 3.3. Problem solving in emergency situation
4. Method of assessment	The assessor may select two or more of the following assessment methods to objectively assess the candidate: 4.1. Observation 4.2. Questioning 4.3. Third Party 4.4. Portfolio
5. Resource Implication	The following resources MUST be provided: 5.1. Tools 5.2. Test equipment/instruments 5.3. Materials 5.4. PPE 5.5. Technical manuals
6. Context of Assessment	Assessment may be conducted in the workplace or in a simulated environment

UNIT TITLE : **MAINTAIN COMPUTER SYSTEMS AND NETWORKS**
 UNIT CODE : **ELC724319**
 UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes needed to maintain and service computer systems and networks.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> items are elaborated in the range of Variables
1. Plan and prepare for maintenance	1.1. Maintenance is planned and prepared in line with job requirements. 1.2. <i>OHS policies and procedures</i> are followed in line with job requirements. 1.3. <i>Computer systems and networks</i> for maintenance are checked against specifications and requirements. 1.4. <i>Materials</i> necessary to complete the work are obtained in accordance with established procedures and checked against job requirements. 1.5. <i>Tools, equipment and testing devices</i> needed for the maintenance are obtained and checked for correct operation and safety 1.6. Computer systems and networks maintained are identified from the job/service order or instructions
2. Maintain computer systems and networks	2.1. Appropriate <i>personal protective equipment</i> is used in line with standard procedures. 2.2. Normal function of computer systems and networks are checked in accordance with manufacturer's instructions. 2.3. Scheduled/periodic maintenance is performed in accordance with manufacturer's requirements. 2.4. Where necessary, needed repairs/replacements are made in accordance with established procedures. 2.5. Unplanned events or conditions are responded to in accordance with established procedures
3. Inspect and test the computer systems and networks	3.1. Final inspections are undertaken to ensure that the testing conducted on the device conforms with the manufacturer's instruction/manual 3.2. Computer systems and networks are checked to ensure safe operation. 3.3. Work site is cleaned and cleared of all debris and left in safe condition in accordance with company procedures 3.4. Report is prepared and completed according to company requirements

Range of Variables

Variable	Range
1. OH & S policies and procedures	1.1. OH & S guidelines 1.2. Philippine environmental standards
2. Computer systems and networks	Includes but not limited to: 2.1. Servers 2.2. peripherals 2.3. desktop computers
3. Materials	Includes but not limited to: 3.1. disks 3.2. CD
4. Tools	Tools for: cutting, shaping, drilling, threading, tapping, finishing, dismantling, and assembling. Tool set includes but not limited to: 4.1. Pliers (assorted) 4.2. Screw drivers (assorted) 4.3. Special tools
5. Equipment/testing devices	5.1. Equipment includes but not limited to: 5.1.1. Maintenance bench 5.1.2. Power supply equipment 5.2. Testing devices include but not limited to: 5.2.1. Multi-meter 5.2.2. software
6. Personal protective equipment	Includes but not limited to: 6.1. Goggles/glasses 6.2. Mask 6.3. Gloves 6.4. Anti-static wrist wrap

Evidence Guide

<p>1. Critical aspect of competency</p>	<p>Assessment must show that the candidate:</p> <ul style="list-style-type: none"> 1.1 Interpreted work instructions according to job requirements. 1.2 Conducted maintenance properly on the systems using standard procedures 1.3 Diagnosed faults in the systems 1.4 Checked the maintained/serviced systems to ensure safety 1.5 Documented the tasks undertaken
<p>2. Underpinning knowledge</p>	<p>Includes but not limited to:</p> <ul style="list-style-type: none"> 2.1 Occupational health and safety 2.2 PC systems 2.3 Computer Operating Systems 2.4 Use of tools 2.5 Mathematical calculations 2.6 Electrical theory 2.7 Electronics theory 2.8 Wiring techniques 2.9 Drawing interpretation 2.10 Computer operations 2.11 Advanced networking 2.12 Network cabling 2.13 Viruses 2.14 Use of applications software

<p>3. Underpinning skills</p>	<p>3.1 Reading skills required to interpret work instructions</p> <p>3.2 Communication skills needed to interpret and define work procedures</p> <p>3.3 Problem solving in emergency situation</p> <p>3.4 Network Cabling</p> <p>3.5 Connecting computers to wired and wireless LAN</p> <p>3.6 Removing viruses from infected machines</p>
<p>4. Method of assessment</p>	<p>The assessor must select two of the following assessment methods to objectively assess the candidate:</p> <p>4.1 Observation with oral Questioning</p> <p>4.2 Interview</p> <p>4.3 Third Party</p> <p>4.4 Portfolio</p>
<p>5. Resource Implication</p>	<p>The following resources MUST be provided:</p> <p>5.1 Tools</p> <p>5.2 Computers and peripherals</p> <p>5.3 Test instruments</p> <p>5.4 Materials</p> <p>5.5 PPE</p> <p>5.6 Technical manuals</p>
<p>6. Context of Assessment</p>	<p>Assessment may be conducted in the workplace or in a simulated environment</p>

SECTION 3 TRAINING STANDARDS

These guidelines are set to provide the Technical and Vocational Education and Training (TVET) providers with information and other important requirements to consider when designing training programs for Computer Hardware Servicing NC II.

3.1. CURRICULUM DESIGN

Course Title: **COMPUTER HARDWARE SERVICING** NC Level **NC II**
 Training Hours: **18 Hours (Basic)**
18 Hours (Common)

Course Description:

This course is designed to develop the basic knowledge, skills, and attitudes of a Computer Service Technician in accordance with industry standards.

To obtain this, all units prescribed for this qualification must be achieved:

BASIC COMPETENCIES

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
1. Participate in workplace communication	1.1 Obtain and convey workplace information. 1.2 Complete relevant work related documents. 1.3 Participate in workplace meeting and discussion.	Group discussion Interaction	<ul style="list-style-type: none"> • Demonstration • Observation • Interviews/questioning
2. Work in a team environment	2.1 Describe and identify team role and responsibility in a team. 2.2 Describe work as a team member.	Discussion Interaction	<ul style="list-style-type: none"> • Demonstration • Observation • Interviews/questioning
3. Practice career professionalism	3.1 Integrate personal objectives with organizational goals. 3.2 Set and meet work priorities. 3.3 Maintain professional growth and development.	Discussion Interaction	<ul style="list-style-type: none"> • Demonstration • Observation • Interviews/questioning
4. Practice occupational health and safety	4.1 Evaluate hazard and risks 4.2 Control hazards and risks 4.3 Maintain occupational health and safety awareness	Discussion Plant tour Symposium	<ul style="list-style-type: none"> • Observation • Interview

COMMON COMPETENCIES

SECTOR: INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) NC II

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
1. Apply Quality Standards	1.1. Asses quality of received materials 1.2. Assess own work 1.3. Engage in quality improvement	1. Field trip 2. Symposium 3. Problem solving 4. Film showing 5. Simulation 6. Individualize learning 7. On the job training	1. Demonstration and questioning 2. Observation and questioning 3. Third party report
2. Perform Computer Operation	2.1. Set-up workstation 2.2. Prepare storage media 2.3. Work with files and objects 2.4. Manipulate word processing software 2.5. Manipulate spreadsheet software 2.6. Manipulate customize and database applications 2.6. Utilize the internet 2.7. Maintain computer hardware and software	1. Modular 2. Film showing 3. Computer based training (e-learning) 4. Project method 5. On the job training	1. Demonstration and questioning 2. Observation and questioning 3. Third party report 4. Assessment of output product 5. Portfolio 6. Computer based assessment

CORE COMPETENCIES

Course Title: **COMPUTER HARDWARE SERVICING**

NC Level **NC II**

Suggested Nominal Training Hours: **320 HOURS**

Course Description:

This course is designed to develop knowledge, skills, and attitudes of a Computer Service Technician in accordance with industry standards. It covers core competencies such as install, maintain, configure, and diagnose computer systems and networks.

To obtain this, all units prescribed for this qualification must be achieved:

Unit of Competency	Learning Outcome	Methodology	Assessment Approach
1. Install computer systems and networks	1.1. Identify, explain and apply OH&S policies and procedures in installing computer system and networks 1.2. Identify and explain the use/ function of different types of computers, its components, peripheral devices, network system configurations, device specifications, tools, equipment and testing instruments. 1.3. Install the computer systems and networks hardware 1.4. Install operating system, application program software and device drivers 1.5. Perform systematic inspection and apply specific testing procedures to isolate and remedy installation troubles	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Viewing multimedia 	<ul style="list-style-type: none"> • Written examination • Practical examination

Unit of Competency	Learning Outcome	Methodology	Assessment Approach
2. Configure computer system and network	<p>2.1. Identify, explain and apply OHS policies and procedures in configuring computer systems and networks</p> <p>2.2. Identify and explain the use/function of different types of tools, and testing instruments for configuring computer systems and networks</p> <p>2.3. Draw and interpret electronic symbols, schematic diagrams and different network configurations</p> <p>2.4. Identify and relate/interpret symptoms and troubles by ocular inspection and conduct specific testing to isolate the faults and problems</p> <p>2.5. Draw network diagram and perform calculation on the identified systems and networks</p> <p>2.6. Perform periodic check on the computer systems and networks</p> <p>2.7. Document and record sequence of events in configuring systems and networks</p>	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Viewing multimedia 	<ul style="list-style-type: none"> • Written examination • Practical examination

Unit of Competency	Learning Outcome	Methodology	Assessment Approach
<p>3. Diagnose and troubleshoot computer systems and networks</p>	<p>3.1. Identify, explain, and apply OH & S policies and procedures in diagnosing computer systems and networks</p> <p>3.2. Identify and explain the use/function of different types of tools and testing instruments in diagnosing computer systems and networks</p> <p>3.3. Explain and apply the correct techniques in harnessing, cabling and soldering wires and joints</p> <p>3.4. Draw the flow diagram of troubleshooting and explain the procedures and steps in isolating the trouble</p> <p>3.5. Inspect and record the initial condition, specification and other vital information of the computer systems and networks</p> <p>3.6. Identify and relate the correct symptoms and troubles by ocular inspection and isolate the faults and problems systematically</p> <p>3.7. Replace defective component with correct device specification and without damage to computer systems and networks</p> <p>3.8. Perform regular check and record the normal and periodic test data</p>	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Viewing multimedia 	<ul style="list-style-type: none"> • Written examination • Practical examination

Unit of Competency	Learning Outcome	Methodology	Assessment Approach
4. Maintain computer systems and networks	<p>4.1. Identify, explain, and apply OH & S policies and procedures in maintaining computer systems and networks</p> <p>4.2. Identify and explain the use/function of different types of tools, and testing instruments for maintaining computer systems and networks</p> <p>4.3. Identify and explain different types of cleaning aids, software diagnostics and anti-viruses used in maintaining computer systems and networks</p> <p>4.4. Disassemble and assemble computer system unit</p> <p>4.5. Perform computer system hardware's preventive maintenance</p> <p>4.6. Perform computer system software's preventive maintenance</p> <p>4.7. Inspect and record the condition, and other vital information of the computer systems and networks</p> <p>4.8. Document and record the sequence of events in maintaining computer systems and networks</p>	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Viewing multimedia 	<ul style="list-style-type: none"> • Written examination • Practical examination

3.2. TRAINING DELIVERY

The delivery of training should adhere to the design of the curriculum. Delivery should be guided by the 10 basic principles of the competency-based TVET.

- The training is based on curriculum developed from the competency standards;
- Learning is modular in its structure;
- Training delivery is individualized and self-paced;
- Training is based on work that must be performed;
- Training materials are directly related to the competency standards and the curriculum modules;
- Assessment is based in the collection of evidence of the performance of work to the industry required standard;
- Training is based both on and off-the-job components;
- Allows for recognition of prior learning (RPL) or current competencies;
- Training allows for multiple entry and exit; and
- Approved training programs are nationally accredited.

The competency-based TVET systems recognizes various types of delivery modes, both on and off-the-job as long as the learning is driven by the competency standards specified by the industry. The following training modalities may be adopted when designing training programs:

- The dualized mode of training delivery is preferred and recommended. Thus programs would contain both in-school and in-industry training or fieldwork components. Details can be referred to the Dual Training System (DTS) Implementing Rules and Regulations.
- Modular/self-paced learning is a competency-based training modality wherein the trainee is allowed to progress at his own pace. The trainer facilitates the training delivery.
- Peer teaching/mentoring is a training modality wherein fast learners are given the opportunity to assist the slow learners.
- Supervised industry training or on-the-job training is an approach in training designed to enhance the knowledge and skills of the trainee through actual experience in the workplace to acquire a specific competencies prescribed in the training regulations.
- Distance learning is a formal education process in which majority of the instruction occurs when the students and instructors are not in the same place. Distance learning may employ correspondence study, or audio, video or computer technologies.

3.3. TRAINEE ENTRY REQUIREMENTS

Trainees or students wishing to gain entry into this course should possess the following requirements:

- can communicate either oral and written;
- must be physically and mentally fit
- with good moral character; and
- must pass the trainability/aptitude test.

This list does not include specific institutional requirements such as educational attainment, appropriate work experience, and others that may be required of the trainees by the school or training center delivering the TVET program.

3.4. LIST OF TOOLS, EQUIPMENT AND MATERIALS

COMPUTER HARDWARE SERVICING – NC II

Recommended list of tools, equipment and materials for the training of 10 trainees for Computer Hardware Servicing – NC II

QUANTITY	TOOLS
10 pieces	Screwdriver (standard)
10 pieces	Screwdriver (Philips)
10 pieces	Long nose pliers
10 pieces	Mechanical pliers
10 sets	Allen wrench
10 units	Electronic tester
5 pieces	Crimping tools
10 pieces	Soldering gun
10 pieces	Solder sucker
1 spool	Lead
5 pieces	Wire stripper

QUANTITY	EQUIPMENT
10 sets	Computer with peripherals
10 sets	Computer tables and chair (ergonomic)
1 unit	Internet subscription
10 units	Uninterruptible Power Supply (UPS)
1 unit	Server
1 unit	Hub / Switch
1 unit	Modem
1 unit	Fax machine
1 unit	PC Video camera
2 units	External CD writer
2 units	External zip drive
2 units	scanner
2 units	printers
2 pieces	Flash disk / Memory stick

QUANTITY	MATERIALS
10 sets	Software applications
2 sets	Network OS software
50 pieces	RJ 45
1 box	UTP cable
1 can	Contact cleaner
1 piece	Whiteboard

QUANTITY	RESOURCES / MANUALS
10 pieces	Motherboard's manual and installer
10 pieces	Video device driver installer
10 pieces	Sound device driver installer
	Computer book, PC Magazines and journals

3.5. TRAINING FACILITIES

The Computer Service Workshop must be in an infrastructure facility that is generally accepted to industry standards and practice. Based on class size of minimum of 10 student/trainees the space requirements for the teaching/ learning and circulation areas are as follows:

TEACHING / LEARNING AREAS	SIZE (in METER)	AREA (in Sq. Meters)	TOTAL AREA (in Sq. Meters)
• lecture area	4 x 5	20	20
• laboratory (cubicle)	1.5 x 2 (10)	30	30
• learning resource / storage	4 x 5	20	20
• circulation area		20	20
Total Workshop Area:			90

3.6. TRAINERS QUALIFICATION

COMPUTER HARDWARE SERVICING – NC II

TRAINERS QUALIFICATION (TQ II)

- Must be a holder of NC II or its equivalent qualification
- Must have undergone training on Training Methodology III (TM III)
- Must be physically and mentally fit
- *Must have at least 2 years relevant job/industry experience
- must be a civil service eligible (for government position or appropriate professional license issued by the Professional Regulatory Commission)

*Optional. Only when required by the hiring institution.

Reference: TESDA Board Resolution No. 2004 – 03

3.7 INSTITUTIONAL ASSESSMENT

Institutional assessment is undertaken by trainees to determine their achievement of units of competency. A certificate of achievement is issued for each unit of competency.

SECTION 4 NATIONAL ASSESSMENT AND CERTIFICATION ARRANGEMENTS

- 4.1 To attain the National Qualification of Computer Hardware Servicing NC II, the candidate must demonstrate competence in all units listed in Section 1. Successful candidates shall be awarded a National Certificate signed by the TESDA Director General.
- 4.2 The qualification of Computer Hardware Servicing NC II may be attained through demonstration of competence through a single comprehensive project-type assessment covering all required units of competency of the qualification.
- 4.3 Assessment shall focus on the core units of competency. The basic and common units shall be integrated or assessed concurrently with the core units.
- 4.4 The following are qualified to apply for assessment and certification:
 - 4.4.1. Graduate of formal, non-formal, and informal including enterprise-based training programs.
 - 4.4.2. Experienced workers (wage employed or self employed)
- 4.5 The guidelines on assessment and certification are discussed in detail in the Procedures Manual on Assessment and Certification and Guidelines on the Implementation of the Philippine TVET Qualification and Certification System (PTQCS).

ANNEX A COMPETENCY MAP

BASIC COMPETENCIES

Receive and Respond to workplace communication	Work with Others	Demonstrate Work Values	Participate in Workplace Communication	Work in a Team Environment	Practice Career Professionalism
Practice occupational Health and Safety Procedures	Practice Housekeeping Procedures (5S)	Lead Workplace Communication	Lead Small Team	Develop and Practice Negotiation Skills	Solve Problems Related to Work Activities
Use Mathematical Concepts and Techniques	Use Relevant Technologies	Utilize Specialist Communication skills	Develop Team and Individual	Apply Problem Solving Techniques in the Workplace	Collect, Analyze and Organize Information
Plan and Organize Work	Promote Environmental Protection				

COMMON COMPETENCIES

Apply Quality Standards	Perform Computer Operations	Perform Mensuration and Calculation	Prepare and Interpret Technical Drawing	Use Hand Tools	Terminate and Connect Electrical Wiring and Electronic Circuits
Maintain and Repair Electronic Systems and Components	Test Electronic / Electromechanical Components and Devices				

CORE COMPETENCIES

Install Instrumentation and Control Devices	Calibrate Instrumentation and Control Devices	Configure Instrumentation and Control Devices	Loop Check Instrumentation and Control Devices	Maintain and Repair Instrumentation and Control Devices	Start-up and Commissioning Instrumentation and Control Devices	Diagnose and Troubleshoot Instrumentation Control Systems
Install Mechatronic Devices	Calibrate and Configure Mechatronic Devices	Configure and Apply Mechatronic Software Programs	Diagnose and Troubleshoot Mechatronic (Industrial Automation) Systems	Maintain and Repair Mechatronic (Industrial Automation) Systems	Commission Mechatronic (Industrial Automation) Systems	Service and Repair Domestic Appliances
Service and Repair Audio Systems and Products	Service and Repair Consumer Video Systems and Products	Service and Repair Business Machines	Install Computer Systems and Networks	Configure Computer Systems and Networks	Diagnose and Troubleshoot Computer Systems and Networks	Maintain Computer Systems and Networks



Qualification for NC II

DEFINITION OF TERMS

1. **Computer System** - The complete computer made up of the CPU, memory and related electronics (main cabinet), all the peripheral devices connected to it and its operating system. Computer systems fall into two broad divisions: clients and servers. Client machines fall into three categories from low to high end: laptop, desktop and workstation. Servers range from small to large: low-end servers, midrange servers and mainframes.
2. **Configuration** - The makeup of a system. To "configure" is to choose options in order to create a custom system. "Configurability" is a system's ability to be changed or customized.
3. **Connector** - Any plug and socket that links two devices together. Although taken for granted and rarely in the limelight, connectors are a huge industry, and the quality of these components is more critical than most people would imagine. When not designed or constructed properly, they often become the weakest element in an electronic system.
4. **Display Adapter** - A plug-in card in a desktop computer that converts the images created in the computer to the electronic signals required by the monitor. It determines the maximum resolution, refresh rate and number of colors that can be displayed, which the monitor must also be able to support. On many PC motherboards, the display adapter circuits are built into the chipset, and an AGP or PCI card is not required.
5. **Expansion Board** - A printed circuit board that plugs into an expansion slot and extends the computer's capability to control a peripheral device. All the boards (cards) that plug into a computer's bus are expansion boards, such as display adapters, disk controllers, network adapters and sound cards.
6. **Expansion Bus** - An input/output bus typically comprised of a series of slots on the motherboard. Expansion boards (cards) are plugged into the bus. ISA and PCI are the common expansion buses in a PC.
7. **Graphical User Interface** - A graphics-based user interface that incorporates movable windows, icons and a mouse. The ability to resize application windows and change style and size of fonts are the significant advantages of a GUI vs. a character-based interface. GUIs have become the standard way users interact with a computer, and the major GUIs are the Windows and Mac interfaces along with Motif for Unix and the GNOME and KDE interfaces for Linux.
8. **Motherboard** - Also called the "system board," it is the main printed circuit board in an electronic device, which contains sockets that accept additional boards. In a desktop computer, the motherboard contains the CPU, chipset, PCI bus slots, AGP slot, memory sockets and controller circuits for the keyboard, mouse, disks and printer. It may also have built-in controllers for modem, sound, display and network, obviating the need to plug in a card. A laptop motherboard typically has all peripheral controllers built in.

9. **Operating System** - The master control program that runs the computer. The first program loaded when the computer is turned on, its main part, the "kernel," resides in memory at all times. The operating system sets the standards for all application programs that run in the computer. The applications "talk to" the operating system for all user interface and file management operations. Also called an "executive" or "supervisor," an operating system performs the following functions.
10. **Peripheral** -Any hardware device connected to a computer, such as a monitor, keyboard, printer, disk, tape, graphics tablet, scanner, joy stick, paddle or mouse
11. **Server** - A computer system in a network that is shared by multiple users. Servers come in all sizes from x86-based PCs to IBM mainframes. A server may have a keyboard, monitor and mouse directly attached, or one keyboard, monitor and mouse may connect to any number of servers via a KVM switch. Servers may be also be accessed only through a network connection as well.
12. **Sound Card** - Also called a "sound board" or "audio adapter," it is a computer expansion board that records and plays back sound, providing inputs from a microphone or other sound source and outputs to speakers or an external amplifier. The de facto standard for sound card compatibility in PCs is Creative Labs' Sound Blaster.
13. **User Interface** - All graphics based today, the user interface includes the windows, menus and method of interaction between you and the computer. Prior to the Mac, Windows and Motif (Unix) interfaces, all interaction was based on commands entered by the user. Operating systems may support optional interfaces and allow a new shell, or skin, to be used instead.
14. **Virus** - Software used to infect a computer. After the virus code is written, it is buried within an existing program. Once that program is executed, the virus code is activated and attaches copies of itself to other programs in the system. Infected programs copy the virus to other programs.