REPUBLIC OF KENYA

NATIONAL OCCUPATIONAL STANDARD

FOR

ICT TECHNICIAN

KNQF LEVEL 6

CYCLE 3

PROGRAMME CODE: 061 2554A

TVET CDACC
P.O. BOX 15745-00100
NAIROBI

Council Secretary/CEO
TVET Curriculum Development, Assessment and Certification Council
P.O. Box 15745–00100
Nairobi, Kenya
Email: info@tvetcdacc.go.ke

FOREWORD

Provision of quality education and training is fundamental to the Government's overall strategy for socio-economic development. Quality education and training contribute to achievement focused on Kenya's development blueprint and sustainable development goals.

Reforms in the education and training sector are necessary for achievement of Kenya Vision 2030 and meeting the provisions the Constitution of Kenya. The education sector had to be aligned to the Constitution and this resulted in formulation of the Policy Framework for Reforming Education and Training (Sessional Paper No. 1 of 2019). A key feature of this policy is the change in the design and delivery of TVET training. The reforms include making TVET competency-based, developing the curriculum in collaboration with industry, certifying learners based on demonstrated competence, and allowing multiple entry and exit points in TVET programmes.

These reforms emphasize the role of industry as key collaborators in occupation standard development to ensure it aligns with their competence needs. It is against this background that this occupation standard has been developed.

It is my conviction that this occupation standard will play a great role towards development of competent human resource for the ICT sector's growth and sustainable development.

PRINCIPAL SECRETARY
STATE DEPARTMENT FOR TVET
MINISTRY OF EDUCATION

PREFACE

Kenya Vision 2030 aims to transform the country into a newly industrializing, middle-income country providing high quality life to all its citizens by the year 2030. Kenya intends to create a globally competitive and adaptive human resource base to meet requirements of a rapidly industrializing economy through life-long education and training. TVET has a responsibility of facilitating the process of inculcating knowledge, skills and worker behaviour necessary for catapulting the nation to a globally competitive country, hence the paradigm shift to embrace Competency Based Education and Training (CBET).

The Technical and Vocational Education and Training Act No. 29 of 2013 and the Sessional Paper No. 1 of 2019 on Reforming Education and Training in Kenya, emphasized the need to reform curriculum development, assessment and certification. This called for a shift to CBET to address the mismatch between skills acquired through training and skills needed by industry as well as increase the global competitiveness of Kenyan labour force.

This occupation standard has been developed in adherence to the Kenya National Qualification Framework and CBETA standards and guidelines. The occupation standard is designed and organized into Units of Learning with Learning Outcomes; suggested delivery methods, training/learning resources and methods of assessing the trainee's achievement. The occupation standard is competency-based and allows multiple entry and exit to the course.

I am grateful to the Council Members, Council Secretariat, ICT NSSC, expert workers and all those who participated in the development of this occupation standard.

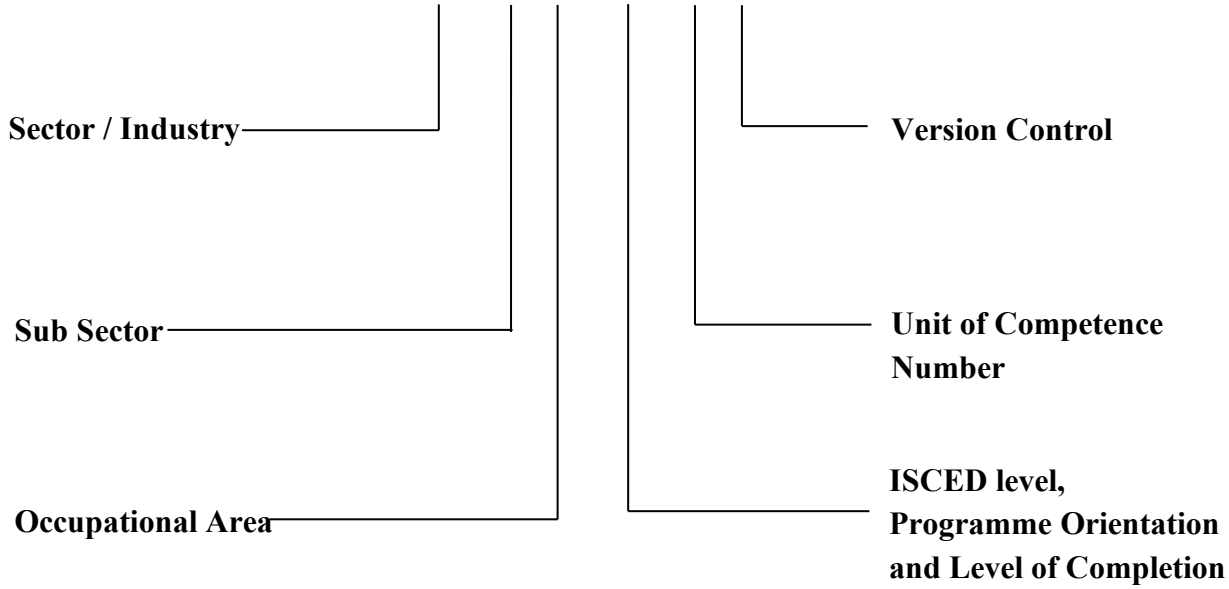
CHAIRPERSON, TVET CDACC

ACRONYMS

EMS	Environmental Management Systems
ERP	Enterprise Resource Planning
ICT	Information Communication Technology
POST	Power on Self-Test
SDLC	System Development SRS life cycle
TVET	Technical and Vocational Education and Training
ISCED	International Standard Classification of Education
HSE	Health, safety and environment
BCD	Binary Coded Decimal
ASCII	American Standard Code for Information Interchange
EBCDIC	Extended Binary Coded Decimal Interchange Code
SRS	System Requirements Specification
DSDM	Dynamic system Development model

KEY TO ISCED UNIT CODE

xx x x xxx x x



KEY TO TVET CDACC UNIT CODE

IT/OS/ICTA/CR/01/4/MA

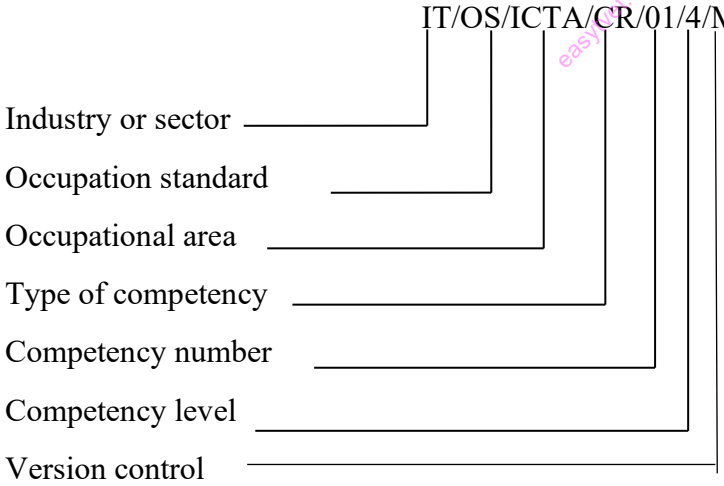


TABLE OF CONTENTS

OCCUPATION STANDARD OVERVIEW

The ICT Technician Level 6 occupational standard is designed to equip learners with comprehensive skills and knowledge essential in supporting or enabling the use of ICT equipment and applications. The program focuses on key competencies, including perform computer essentials, perform computer operations, perform computer network setup, perform computer repair and maintenance, install computer software, perform network design and management, manage computerized database system, manage ICT security, develop desktop application and develop website application.

The qualification consists of core competencies.

SUMMARY OF UNITS OF COMPETENCY

BASIC UNITS OF COMPETENCY		
ISCED UNIT CODE	**TVET CDACC UNIT CODE**	**UNIT TITLE**
0031 441 01A	IT/OS/ICTA/BC/01/5/MA	Apply Communication Skills
0417 441 02A	IT/OS/ICTA/BC/02/5/MA	Apply Work Ethics and Practices
0413 441 03A	IT/OS/ICTA/BC/03/5/MA	Apply Entrepreneurial Skills
COMMON UNITS OF COMPETENCY		
0714 441 04A	IT/OS/ICTA/CC/01/5/MA	Apply Basic Electronics
0613 451 05A	IT/OS/ICTA/CC/02/5/MA	Apply Computer Programming Principles
0613 541 01A	IT/OS/ICTA/CC/03/5/MA	Apply Discrete Mathematical Concepts
0541541 02A	IT/CU/ICTA/CC/04/6/MA	Perform System Analysis and Design
CORE UNITS OF COMPETENCY		
0611 351 01A	IT/OS/ICTA/CR/01/4/MA	Perform Computer Essentials
0611 351 02A	IT/OS/ICTA/CR/02/4/MA	Perform Computer Operations
0612 351 03A	IT/OS/ICTA/CR/03/4/MA	Perform Computer Network Setup
0714 351 04A	IT/OS/ICTA/CR/04/4/MA	Perform Computer Repair and Maintenance

0619 451 06A	IT/OS/ICTA/CR/01/5/MA	Install Computer Software
0612 451 07A	IT/OS/ICTA/CR/02/5/MA	Perform Network Design and Management
0612 451 08A	IT/OS/ICTA/CR/03/5/MA	Manage Computerized Database System
0613 551 03A	IT/OS/ICTA/CR/01/6/MA	Develop Website Application
0612 551 04A	IT/OS/ICTA/CR/02/6/MA	Manage ICT Security Management
0613 551 05A	IT/OS/ICTA/CR/03/6/MA	Develop Desktop Application

BASIC UNITS OF COMPETENCY

APPLY COMMUNICATION SKILLS

ISCED UNIT CODE: 0031 441 01A

TVET CDACC CODE: IT/OS/ICTA/BC/01/5/MA

UNIT DESCRIPTION

This unit covers the competencies required to apply communication skills. It involves applying communication channels, written, non-verbal, oral, and grouping communication skills.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes that make up workplace function	**PERFORMANCE CRITERIA** These are assessable statements that specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range***
1. Apply communication channels	1.1 Specific communication channels are identified and applied as per workplace requirements.
	1.2 Challenges are identified and addressed as per the operational standards of the organization.
	1.3 Communication channels are evaluated to meet workplace needs.
2. Apply written communication skills	2.1 Types of written communication are identified and applied according to the workplace requirements.
	2.2 Written communication needs are identified and implemented according to workplace procedures.
	2.3 Written communication guidelines are analyzed, evaluated, and revised based on workplace needs.
3. Apply non-verbal communication skills	3.1 Existing non-verbal communication techniques are identified and applied as per organization policy.

ELEMENT These describe the key outcomes that make up workplace function	PERFORMANCE CRITERIA These are assessable statements that specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range***
	3.2 Non-verbal communication techniques are articulated and modelled to enhance inclusivity according to workplace requirements.
4. Apply oral communication skills	4.1 Types of oral communication are identified and established as per organization policy.
	4.2 Pathways of oral communication are identified and established as per organization policy.
	4.3 Pathways of oral communication are reviewed according to organization procedures.
	4.4 Pathways of oral communication are maintained according to the organization standards.
5. Apply group communication skills	5.1 Group communication strategies are applied as per the workplace needs.
	5.2 Groups are organized in accordance with workplace procedures.
	5.3 Effective questioning, listening and non-verbal communication techniques are used as per needs.
	5.4 Group communication challenges are identified and addressed according to the workplace needs.

RANGE

This section provides the work environment and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

Variable	Range

Variable	Range
1. Communication strategies may include but are not limited to:	• Language switch • Comprehension check • Repetition • Asking confirmation • Paraphrasing • Clarification request • Translation • Restructuring • Generalization
2. Effective group interaction may include but not limited to:	• Identifying and evaluating what is occurring within an interaction in a non-judgmental way. • Using active listening. • Making decision about appropriate words, behavior. • Putting together response which is culturally appropriate. • Expressing an individual perspective. • Expressing own philosophy, ideology and background and exploring impact with relevance to communication
3. Situations may include but are not limited to:	• Establishing rapport • Eliciting facts and information • Facilitating resolution of issues • Developing action plans

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit of competency.

Required Skills

The individual needs to demonstrate the following skills:

- Active listening
- Interpretation
- Negotiation

- Writing
- Oral skills
- Creative thinking
- Critical thinking
- Decision making
- Analytical
- Innovation
- Conflict skills
- Leadership
- Problem solving skills
- Management
- Organizational
- Teamwork

Required Knowledge

The individual needs to demonstrate knowledge of:

- Communication process
- Dynamics of groups
- Styles of group leadership
- Key elements of communications strategy
- Principles of effective communication
- Turn-taking techniques
- Conflict resolution techniques
- Work planning
- Work organization
- Company policies
- Company operations and procedure standards
- Fundamental rights at the workplace
- Personal hygiene
- Accountability
- Workplace problems and how to deal with them

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills, knowledge, and range.

1. Critical aspects of Competency.	Assessment requires evidence that the candidate: 1.1 Identified and applied specific communication channels as per workplace requirements. 1.2 Identified and applied specific written communication correspondence according to the workplace requirements. 1.3 Applied and developed non-verbal strategies to communicate in all areas of the workplace requirements. 1.4 Established pathways of oral communication as per workplace policy. 1.5 Applied group communication strategies based on workplace needs.
2. Resource Implications	The following resources should be provided: 2.1 Access to relevant workplace where assessment can take place. 2.2 Appropriately simulated environment where assessment can take place. 2.3 Resources relevant to the proposed activity or tasks.
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Observation 3.2 Oral assessment 3.3 Portfolio of evidence 3.4 Interviews 3.5 Third party report 3.6 Written assessment 3.7 Practical assessment 3.8 Projects

4. Context of Assessment	Competency may be assessed: 4.1 On-the-job 4.2 In a simulated work environment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

APPLY WORK ETHICS AND PRACTICES

ISCED UNIT CODE: 0417 441 02A

TVET CDACC CODE: IT/OS/ICTA/BC/02/5/MA

UNIT DESCRIPTION

This unit covers competencies required to effectively apply work ethics and practices. It involves the ability to: apply self-management skills, promote ethical work practices and values, promote teamwork, maintain professional and personal development, apply problem-solving and promote customer care.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function.	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in Range***
1. Apply self-management skills	1.1 Personal vision, mission and goals are formulated based on potential and concerning organization objectives and strategic plan
	1.2 Self-esteem and a positive self-image are developed and maintained based on value
	1.3 Emotional intelligence and stress management are demonstrated as per workplace requirements.
	1.4 Assertiveness is developed and maintained based on the requirements of the job.
	1.5 Accountability and responsibility for one's actions are demonstrated based on workplace instructions.
	1.6 Time management, attendance and punctuality are observed as per the organization's policy.
	1.7 Personal goals are managed as per the organization's objective

ELEMENT These describe the key outcomes which make up workplace function.	PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in Range***
	1.8 Self-strengths and weaknesses are identified based on personal objectives
	1.9 Motivation, initiative and proactivity are utilized as per the organization policy
	1.10 Individual performance is evaluated and monitored according to the agreed targets.
2. Promote ethical work practices and values	2.1 Integrity is demonstrated as per acceptable norms
	2.2 Codes of conduct is applied as per the workplace requirements
	2.3 Policies and guidelines are observed as per the workplace requirements
	2.4 Professionalism is exercised in line with organizational policies
3. Promote Team work	3.1 ***Teams*** are formed to enhance productivity based on organization's objectives
	3.2 Duties are assigned to teams under the organization policy.
	3.3 Team activities are managed and coordinated as per set objectives.
	3.4 Team performance is evaluated based on set targets as per workplace policy.
	3.5 Conflicts are resolved between team members in line with organization policy.
	3.6 Gender and diversity-related issues are identified and mainstreamed in accordance with workplace policy.
	3.7 Healthy relationships are developed and maintained in line with the workplace.

ELEMENT These describe the key outcomes which make up workplace function.	PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in Range***
	3.8 Adaptability and flexibility are applied in dealing with team members as per workplace policies
4. Maintain professional and personal development	4.1 Personal growth and development needs are identified and assessed in line with the requirements of the job.
	4.2 Training and career opportunities are identified and utilized based on job requirements.
	4.3 Resources for training are mobilized and allocated based on organizations and individual skills needs.
	4.4 Licenses and certifications relevant to the job and career are obtained and renewed as per policy.
	4.5 Recognitions are sought as proof of career advancement in line with professional requirements.
	4.6 Work priorities and personal commitments are balanced and managed based on the requirements of the job and personal objectives.
	4.7 Dynamism and on-the-job learning are embraced in line with the organization's goals and objectives.
5. Apply Problem solving skills	5.1 ***Creative, innovative*** and practical solutions are developed based on the problem
	5.2 Independence and initiative in identifying and solving problems are demonstrated based on the requirements of the job.
	5.3 Team problems are solved as per the workplace guidelines
	5.4 Problem-solving strategies are applied as per the workplace guidelines
	5.5 Problems are analysed and assumptions tested as per the context of data and circumstances

ELEMENT These describe the key outcomes which make up workplace function.	PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in Range***
6. Promote Customer Care	6.1 Customers' needs are identified based on their characteristics 6.2 Customer feedback is allowed and
	6.3 Facilitated in line with organization policies.
	6.4 Customer concerns and complaints are analyzed and resolved in line with the set organizational culture.
	6.5 Proactive customer outreach programs are implemented as per organizational policies
	6.6 Customer retention strategies are developed and implemented in line with the organizational policy

RANGE

This section provides work environment and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance.

Variable	Range
1. Feedback may include but not limited to:	• Verbal • Written • Informal • Formal
2. Conflicts include but are not limited to:	• Interpersonal Conflict. • Intrapersonal Conflict. • Intergroup Conflict. • Intragroup Conflict.

Variable	Range
3. Relationships may include but not limited to:	• Man/Woman • Trainer/trainee • Employee/employer • Client/service provider • Husband/wife • Boy/girl • Parent/child • Sibling relationships
4. Team may include but not limited to:	• Small work group • Staff in a section/department • Inter-agency group • Virtual teams
5. Personal growth may include but not limited to:	• Growth in the job • Career mobility • Gains and exposure the job gives • Net workings • Benefits that accrue to the individual as a result of noteworthy performance
6. Personal objectives may include but not limited to:	• Long term • Short term • Broad • Specific
7. Trainings and career opportunities may include but not limited to	• Participation in training programs • Serving as Resource Persons in conferences and workshops • Capacity building
8. Resource may include may but not limited to:	• Human • Financial • Technology
9. Creative and innovative may include but not limited to:	• New ideas • Original ideas

Variable	Range
	• Different ideas • Methods/procedures • Processes • New tools
10. Emerging issues may include but not limited to:	• Artificial Intelligence • Data confidentiality • National cohesion • Open offices

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit of competency.

Required Skills

The individual needs to demonstrate the following skills:

- Active listening
- Critical thinking
- Organizational
- Negotiation
- Monitoring
- Evaluation
- Problem solving
- Decision Making
- Leadership
- Creative/innovative thinking
- Adaptability
- Conflict management
- Emotional intelligence
- Teamwork

Required Knowledge

The individual needs to demonstrate knowledge of:

- Work values and ethics
- Company policies and procedures
- Company operations, procedures and standards
- Flexibility and adaptability
- Concept of time and leisure time
- Decision making
- Work planning
- Organizing work
- Monitoring and evaluation
- Record keeping
- Gender and diversity mainstreaming
- Drug and substance abuse
- Professional growth and development
- creativity
- Innovation
- problem solving
- customer care
- mentoring and coaching.
- Emerging issues

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

1. Critical aspects of Competency	Assessment require evidence that the candidate: 1.1 Applied self-management skills as per organizational procedures. 1.2 Promoted ethical practices and values as per organizational procedures. 1.3 Promoted Teamwork as per workplace assignments. 1.4 Maintained professional and personal development as per organizational procedures. 1.5 Applied Problem-solving skills based on work requirements. 1.6 Identified customer needs based on their characteristics.

	1.7 Gave back Customer feedback in line with organization policies.
2. Resource Implications	The following resources should be provided: 2.1 Access to relevant workplace where assessment can take place 2.2 Appropriately simulated environment where assessment can take place. 2.3 Resources relevant to the proposed activity or tasks.
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Observation 3.2 Oral questioning 3.3 Written test 3.4 Portfolio of Evidence 3.5 Interview 3.6 Third party report
4. Context of Assessment	Competency may be assessed: 4.1 On-the-job 4.2 In a simulated work environment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

APPLY ENTREPRENEURIAL SKILLS

ISCED UNIT CODE: 0413 441 03A

TVET CDACC CODE: IT/OS/ICTA/BC/03/5/MA

UNIT DESCRIPTION

This unit covers the competencies required to demonstrate an understanding of entrepreneurship. It involves applying financial literacy, applying entrepreneurial concepts, identifying entrepreneurship opportunities, and applying business legal aspects, innovate business strategies, and develop business plans.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes that make up workplace function.	**PERFORMANCE CRITERIA** These are assessable statements that specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in Range***
1. Apply Financial Literacy Skills	1.1 **Sources of personal and business *funds*** are identified as per financial procedures and standards
	1.2 Personal finances are managed as per financial procedures and standards
	1.3 Savings are managed as per financial procedures and standards
	1.4 Debts are managed as per financial procedures and standards
	1.5 Investments are undertaken as per financial procedures and standards
	1.6 Insurance services are procured as per financial procedures and standards
2. Apply entrepreneurial concept	2.1 Entrepreneurs and Business persons are distinguished as per principles of entrepreneurship
	2.2 ***Types of entrepreneurs*** are identified as per principles of entrepreneurship

ELEMENT These describe the key outcomes that make up workplace function.	PERFORMANCE CRITERIA These are assessable statements that specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in Range***
	2.3 Ways of becoming an entrepreneur are identified as per principles of Entrepreneurship
	2.4 ***Characteristics of Entrepreneurs*** are identified as per principles of Entrepreneurship
	2.5 Salaried employment and self-employment are distinguished as per principles of entrepreneurship
	2.6 ***Requirements for entry into self-employment*** are identified according to business procedures and standards
	2.7 Roles of an Entrepreneur in an enterprise are determined according to business procedures and standards
	2.8 **Contributions of entrepreneurship** to National development are identified as per business procedures and standards
3. Identify entrepreneurial opportunities	3.1 Business ideas are identified as per business procedures and standards
	3.2 Factors to consider when evaluating business opportunity viability are explored based on business procedure and standards
	3.3 Entrepreneurial opportunities are evaluated as per business procedures and standards
	3.4 Business ideas and opportunities are generated as per business procedures and standards

ELEMENT These describe the key outcomes that make up workplace function.	PERFORMANCE CRITERIA These are assessable statements that specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in Range***
	3.5 Business life cycle is analyzed as per business procedures and standards
4. Apply business legal aspects	4.1 ***Forms of business ownership*** are identified as per legal procedures and practices
	4.2 Business Registration and Licensing processes are identified as per legal procedures and practices
	4.3 Types of Contracts and Agreements are analyzed as per legal procedures and practices
	4.4 Employment Laws are identified as per legal procedures and practices
	4.5 Taxation laws are identified as per legal procedures and practices
5. Innovate Business strategies	5.1 Business innovation strategies are determined by the organization standards
	5.2 Creativity in business development is demonstrated in accordance with business standards
	5.3 ***Innovative business standards*** are developed as per business principles
	5.4 Linkages with other entrepreneurs are created as per best practice
	5.5 ICT is incorporated in business growth and development as per best practice

ELEMENT These describe the key outcomes that make up workplace function.	PERFORMANCE CRITERIA These are assessable statements that specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in Range***
6. Develop Business Plan	6.1 Business idea is described as per business procedures and standards
	6.2 Business description is developed as per business plan format
	6.3 Marketing plan is developed as per business plan format
	6.4 Organizational/Management plan is prepared in accordance with business plan format
	6.5 Production/operation plan is prepared in accordance with business plan format
	6.6 Financial plan is prepared in accordance with the business plan format
	6.7 Executive summary is prepared in accordance with business plan format
	6.8 Business plan is presented as per best practice
	6.9 Business ideas are incubated as per institutional policy.

RANGE

This section provides work environment and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance.

Variable	Range
1. Sources of personal funds may include but not limited to:	• Salary/Wages • Investments • Savings

Variable	Range
	• Inheritance • Government Benefits
2. Sources of business finance may include but not limited to:	• Equity Financing • Debt Financing, • Personal Savings/Investment • Retained Earnings • Grants and Subsidies • Crowdfunding • supplier Credit: • Leasing and Asset Financing:
3. Types of entrepreneurs may include but not limited to:	• Innovators • Imitators • Craft • Opportunistic • Speculators
4. Characteristics of Entrepreneurs may include but not limited to:	• Creative • Innovative • Planner • Risk taker • Networker • Confident • Flexible • Persistent • Patient • Independent • Future oriented • Goal oriented
5. Requirements for entry into self-employment may include but not limited to	• Technical skills • Management skills • Entrepreneurial skills

Variable	Range
	• Resources • Infrastructure
6. Forms of businesses ownership may include but not limited to:	• Sole proprietorship • Partnership • Limited companies • Cooperatives
7. Innovative business standards may include but not limited to:	• New products • New methods of production • New markets • New sources of supplies • Change in industrialization

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit of competency.

Required Skills

The individual needs to demonstrate the following skills:

- Analytical
- Management
- Problem-solving
- Root-cause analysis
- Communication

Required Knowledge

The individual needs to demonstrate knowledge of:

- Decision making
- Business communication
- Change management
- Competition
- Risk

- Net working
- Time management
- Leadership
- Factors affecting entrepreneurship development
- Principles of Entrepreneurship
- Features and benefits of common operational practices, e. g., continuous improvement (kaizen), waste elimination,
- Conflict resolution
- Health, safety and environment (HSE) principles and requirements
- Customer care standards
- Basic financial management
- Business strategic planning
- Impact of change on individuals, groups and industries
- Government and regulatory processes
- Local and international market trends
- Product promotion standards
- Market and feasibility studies
- Government and regulatory processes
- Local and international business environment
- Relevant developments in other industries
- Regional/ County business expansion standards

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Identified Sources of personal and business finance as per financial procedures and standards 1.2 Managed Personal finances as per financial procedures and standards 1.3 Made Investment decisions as per financial procedures and standards

	1.4 Generated Business ideas and opportunities based on business procedure and standards 1.5 Analyzed business life cycle based on business procedure and standards 1.6 Determined business innovative standards as per business principles 1.7 Developed and presented a business plan as per regulatory framework.
2. Resource Implications	The following resources should be provided: 2.1 Access to relevant workplace where assessment can take place 2.2 Appropriately simulated environment where assessment can take place
3. Methods of Assessment	Competency may be assessed through: 3.1 Written tests 3.2 Oral questions 3.3 Third party report 3.4 Interviews 3.5 Portfolio
4. Context of Assessment	Competency may be assessed: 4.1 On-the-job 4.2 In a simulated work environment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

COMMON UNITS OF COMPETENCY

APPLY BASIC ELECTRONICS

ISCED UNIT CODE: 0714 441 04A

TVET CDACC CODE: IT/OS/ICTA/CC/01/5/MA

UNIT DESCRIPTION

This unit specifies the competencies required to apply basic electronic. It involves identifying electric circuits, identifying electronic components, applying semi-conductor theory, and classifying computer memory, applying logic gates, applying logic gates and performing Boolean algebra operations.

ELEMENTS AND PERFORMANCE CRETIRIA

ELEMENT	PERFORMANCE CRITERIA *(Bold and italicized terms are elaborated in the Range)*
1. Identify electrical circuits	1.1 Electrical circuit are identified as per electrical engineering principles
	1.2 ***Electrical quantities and their S.I units*** are identified as per electrical engineering standards
	1.3 ***Types of electrical circuits*** are identified as per electrical engineering standards
2. Identify electronic components	2.1 Electronic components are Identified as per electrical engineering standard
	2.2 Characteristic of electronic components are identified as per their operations
	2.3 Application of electronic components are Identified as per workplace functions
	2.4 Characteristics of integrated circuit are identified as per the standard mode of operations.
3. Apply Semi-conductor theory	3.1 Explanation of semiconductor theory is done as per the electronics principles.

ELEMENT	PERFORMANCE CRITERIA *(Bold and italicized terms are elaborated in the Range)*
	3.2 Structure of matter is described as per electronics principles
	3.3 Electrons in conductors and semiconductors are explained as per electronics principles
	3.4 Types of semiconductor materials are identified as per electronics principles
	3.5 P-type and N-type materials are explained as per electronics principles
	3.6 Description of P-N junction diodes operations is done as per their operations
	3.7 Types and operations of transistors are identified as per electronics principles
	3.8 Semiconductor theory is applied in electrical circuits as per electronics principles
4. Classify computer memory	4.1 ***Classification of computer memories*** are identified as per their characteristics
	4.2 Memory hierarchy is identified as per memory speed
	4.3 ***Levels of memory storage*** are identified as per technology used.
	4.4 Classification of memories is done as per the technology used
5. Apply logic gates	5.1 Logic gates are identified as per the Digital Electronics principles
	5.2 Logic circuits are developed as per the standard procedures
	5.3 Logic circuits are simplified as per the standard procedures
	5.4 Apply logic gates in electronic circuits as per digital Electronics principles

ELEMENT	PERFORMANCE CRITERIA *(Bold and italicized terms are elaborated in the Range)*
6. Perform Boolean algebra operations	6.1 Key concepts in Boolean algebra are explained as per the digital electronics principles
	6.2 Boolean Expressions are demonstrated as per the SOPs
	6.3 Basic Boolean operations are performed as per the SOPs
	6.4 Methods of simplifying Boolean expressions are illustrated as per the SOPs
	6.5 Boolean Laws and Theorems are illustrated as per the SOPs
	6.6 Simplification rules for Boolean expressions are illustrated as per the SOPs

RANGE

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

Variable	Range ***May include but is not limited to:***
1. Electrical quantities and their units	• E.M.F in volts • Power in watts • Energy in joules • Resistance in ohms • Current in amperes
2. Types of electrical circuits	• AC – Alternating Current • DC – Direct Current
3. Types and operations of	• Types

Variable	Range *May include but is not limited to:*
transistors	✓ PNP ✓ NPN ● Operations ✓ Forward biasing ✓ Reverse Biasing
4. Types of memories	● Semi-conductor ● Magnetic ● Optical
5. Classification of memories	● RAM ● ROM
6. Levels of memory storage	● Internal ● Main ● Online ● Offline bulk

REQUIRED KNOWLEDGE AND UNDERSTANDING

The individual needs to apply knowledge and understanding of:

- Electrical Components
- Electrical Quantities and units of measurement
- Electrical circuits
- Semiconductor theory
- Types of Computer memories
- Boolean algebra
- Logic gates

FOUNDATION SKILLS

The individual needs to apply the following foundation skills:

- Communications (verbal and written);
- Proficient in ICT
- Time management
- Problem solving
- Decision making
- First aid

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and understanding and range.

1. Critical Aspects of Competency	***Assessment requires evidence that the candidate:*** 1.1 Identified electrical quantities and their S.I units as per electrical engineering standards 1.2 Identified types of electrical circuits as per electrical engineering standards 1.3 Identified electronic components as per electrical engineering standard 1.4 Memory storage as per technology used 1.5 Identified application of electronic components as per work place functions 1.6 Identified type and operations of transistors as per electronics principles 1.7 Identified logic gates as per the Digital Electronics principles 1.8 Developed logic circuits as per the standard procedures 1.9 Simplified logic circuits as per the standard procedures

	1.10Performed basic Boolean operations as per work procedures
2. Resource Implications	The following resources should be provided: 2.1 Appropriately simulated environment where assessment can take place 2.2 Access to relevant work environment 2.3 Resources relevant to the proposed activities or tasks
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Practical 3.2 Projects 3.3 Third party reports 3.4 Portfolio of evidence evaluation 3.5 Written tests
4. Context of Assessment	This Competency may be assessed individually in a workplace or simulated workplace
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

APPLY COMPUTER PROGRAMMING PRINCIPLES

ISCED UNIT CODE: 0613 451 05A

TVET CDACC CODE: IT/OS/ICTA/CC/02/5/MA

UNIT DESCRIPTION

This unit covers the competencies required to apply computer programming principles. It involves applying computer programming skills, demonstrating structured programming skills and demonstrating object-oriented programming skills.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace functions	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements ***(Bold and italicized terms are elaborated in the range)***
1. Apply computer programming skills	1.1 Programming language types are identified as per the user requirements.
	1.2 ***Programming paradigms*** are applied as per user requirements.
	1.3 Program development life cycle is applied as per the work requirements.
	1.4 ***Program design tools*** are applied as per the user requirements.
	1.5 ***Program writing tools*** are identified as per the system requirements.
2. Demonstrate structured programming skills	2.1 ***Identifiers*** are declared as per program design specification.
	2.2 Initialization of variables and constants is performed according to program design specifications.

ELEMENT These describe the key outcomes which make up workplace functions	PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements ***(Bold and italicized terms are elaborated in the range)***
	2.3 User-defined data types are applied as per system requirements.
	2.4 Computer program input is created as per program design.
	2.5 ***Data control structures*** in a program are applied as per program design requirements.
	2.6 ***Data structures*** in a program are applied as per program design specifications.
	2.7 Computer program subroutines are created as per user needs.
	2.8 Computer program output is coded as per user requirements.
	2.9 Computer program debugging is performed as per work procedures.
	2.10 Computer program is compiled as per system requirements.
3. Demonstrate object-oriented programming skills	3.1 Objects and classes are implemented as per work procedures.
	3.2 Objects methods are declared as per application requirements.
	3.3 Namespaces are applied as per wok procedures.
	3.4 Data abstraction concepts are applied as per work procedures.
	3.5 Object encapsulations are applied as per work procedures.
	3.6 Class templates are implemented as per application requirements.
	3.7 Class inheritance is implemented as per application requirements.

ELEMENT These describe the key outcomes which make up workplace functions	PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements ***(Bold and italicized terms are elaborated in the range)***
	3.8 Polymorphism is implemented as per application requirements.

RANGE

This section provides a work environment and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance.

Variable	Range
1. Programming paradigms may include but not limited to:	• Imperative • Functional • Procedural • Object-oriented
2. Program design tools may include but not limited to:	• Flow charts • Decision tables • Decision trees • Pseudocode • Algorithm
3. Program writing tools may include but not limited to:	• Text editors • Compilers Linkers • Debuggers • Special Integrated development Environment (IDE)
4. Identifier may include but not limited to:	• Names assigned to different entities such as variable, functions and arrays.
5. Data control structures may include but not limited to:	• Selection • Loops • Sequence
6. Data structures may include but not limited to:	• Arrays • Queue • Stack • Linked lists

REQUIRED KNOWLEDGE AND SKILLS

This section describes the knowledge and skills required for this unit of competency.

Required knowledge

The individual needs to demonstrate knowledge of:

- Structured programming principles.
- Object oriented programming principles.
- Techniques of system analysis and design.
- Software development methodologies.
- Program development techniques.
- Software program testing and debugging techniques.

Required skills

The individual needs to demonstrate the following skills:

- Communications (verbal and written)
- Proficient in ICT
- Time management
- Problem solving
- Planning
- Decision making

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills range.

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Applied program design tools as per the user requirements. 1.2 Created computer program input as per program design. 1.3 Data control structures in a program are applied as per program design requirements. 1.4 Applied data structures in a program as per program design specifications. 1.5 Created computer program subroutines as per user needs. 1.6 Coded computer program output as per user requirements. 1.7 Compiled computer program as per system requirements 1.8 Compiled objects and classes as per work procedures.

	1.9 Declared objects methods as per application requirements. 1.10 Applied namespaces as per wok procedures. 1.11 Applied data abstraction concepts as per work procedures. 1.12 Applied object encapsulation as per work procedures. 1.13 Implemented class templates as per application requirements.
2. Resource implications	The following resources should be provided: 2.1 Access to relevant workplace where assessment can take place. 2.2 Appropriately simulated environment where assessment can take place. 2.3 Resources relevant to the proposed activity or tasks.
3. Methods of assessment	Competency in this unit may be assessed through: 3.1 Observation 3.2 Portfolio of evidence 3.3 Interviews 3.4 Third party reports 3.5 Written assessment 3.6 Practical assessment 3.7 Projects
4. Context of assessment	Competency may be assessed: 4.1 On-the-job 4.2 In a simulated work environment
5. Guidance information for assessment	5.1 Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

APPLY DISCRETE MATHEMATICAL CONCEPTS

ISCED UNIT CODE: 0541 541 01A

TVET CDACC CODE: IT/OS/ICTA/CC/03/5/MA

UNIT DESCRIPTION:

This unit covers the competence to apply discrete mathematical concepts. It involves carrying out set theory operations, performing matrix operations, applying number systems, applying logic gates, performing sequence and series and demonstrating graph theory.

ELEMENTS AND PERFORMANCE CRETIRIA

ELEMENT These describe the key outcomes which make up workplace functions	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements ***(Bold and italicized terms are elaborated in the range)***
1. Carry out set theory	1.1 ***Sets*** are represented as per workplace requirements.

ELEMENT These describe the key outcomes which make up workplace functions	PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements ***(Bold and italicized terms are elaborated in the range)***
operations	1.2 Sets are applied as per workplace requirements.
	1.3 ***Set Operations*** are applied as per workplace requirements.
2. Perform matrix operations	2.1 ***Matrices*** are identified as per workplace requirements.
	2.2 ***Matrix operations*** are applied as per workplace requirements.
	2.3 Determinant of a matrix is applied as per workplace requirements.
	2.4 Inverse of a matrix is applied as per workplace requirements.
3. Apply Number Systems	3.1 Number systems are identified as per workplace requirements.
	3.2 Base conversion is performed as per workplace requirements.
	3.3 Binary arithmetic operations are performed as per workplace requirements.
	3.4 Binary codes are identified as per workplace requirements.
	3.5 Representation of decimals in BCD is carried out
	3.6 BCD arithmetic is performed as per workplace requirements.

ELEMENT These describe the key outcomes which make up workplace functions	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements ***(Bold and italicized terms are elaborated in the range)***
4. Apply Logic Gates	4.1 Logic gates are identified as per workplace requirements.
	4.2 Boolean Algebra is applied as per workplace requirements
	4.3 Logic gates are applied as per workplace requirements
5. Perform sequence and series operations	5.1 Summation of a sequence is applied as per workplace requirements.
	5.2 Arithmetic series is applied as per workplace requirements
	5.3 Geometric series is applied as per workplace requirements
6. Demonstrate graph theory	6.1 ***Key Graph terminologies*** are applied as per workplace requirements
	6.2 ***Types of graphs*** are applied as per workplace requirements
	6.3 ***Representation of graphs*** are applied as per workplace requirements
	6.4 Applications of graphs are applied as per workplace requirements.

RANGE

This section provides work environment and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance.

Variable	Range
1. Methods of Set representation may include but is not limited to:	• Statement form • Tabular form • Set builder notation
2. Sets may include but is not limited to:	• Finite Set • Infinite Set • Subset • Proper Subset • Universal Set • Empty or Null • Equal • Equivalent Set • Singleton Set or Unit Set • Overlapping Set • Disjoint Set
3. Set operations may include but is not limited to:	• Venn Diagram • Set Union and Set Intersection • Set Difference/Relative Complement • Set Complement
4. Types of matrices may include but is not limited to:	• Square • Symmetric • Skew-symmetric • Diagonal • Identity • Orthogonal

5. Matrix operations may include but not limited to:	• Sum of matrices
	  ○ 2 x 2 matrices
	  ○ 3 x 3 matrices
	• Matrix subtraction
	  ○ 2 x 2 matrices
	  ○ 3 x 3 matrices
	• · Product of two matrices

6. Number systems may include but not limited to:	• Hexadecimal number system • Octal number system • Decimal number system • Binary number system
7. Binary codes may include but not limited to:	• Binary Coded Decimal (BCD) • Gray Code • Excess-3 Code • ASCII • EBCDIC
8. Types of graphs may include but is not limited to:	• Bar graphs • Line graphs • Histogram • Ogive curves
9. Representations of graphs may include but is not limited to:	• Adjacency matrix • Adjacency list

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit of competency.

Required skills

The individual needs to demonstrate the following skills:

- Communications (verbal and written);

- Time management;
- Decision making;
- Research;
- Problem solving;

Required knowledge

The individual needs to demonstrate knowledge of:

- Set Theory
- Matrices
- Relations and Functions
- Recursion
- Sequence and Series
- Graph Theory

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and understanding and range.

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Applied set operations as per workplace requirements. 1.2 Performed matrix operations. 1.3 Applied types of relations as per workplace requirements. 1.4 Applied types of functions as per workplace requirements. 1.5 Applied types of recursion relations as per workplace requirements. 1.6 Applied arithmetic series as per workplace requirements. 1.7 Applied geometric series as per workplace requirements. 1.8 Applied application of graphs as per workplace requirements.
2. Resource Implications	The following resources must be provided: 2.1 Access to relevant workplace where assessment can take place. 2.2 Appropriately simulated environment where assessment can

	take place. 2.3 Resources relevant to the proposed activity or tasks.
3. Methods of Assessment	Competency may be assessed through: 3.1 Portfolio of evidence 3.2 Written tests 3.3 Interviews 3.4 Third party report 3.5 Practical assessment
4. Context of Assessment	Competency may be assessed: 4.1 On-the-job 4.2 In a simulated work environment
5. Guidance information for assessment	1.1 Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

PERFORM SYSTEM ANALYSIS AND DESIGN

ISCED UNIT CODE: 0613 541 02A

TVET CDACC CODE: IT/OS/ICTA/CC/04/5/MA

UNIT DESCRIPTION

This unit covers the competencies required to perform system analysis and design. It involves applying system analysis and design concepts, applying approaches to system development and project planning, performing system analysis, performing system design, performing system testing, performing system implementation and maintenance.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace functions	PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements ***(Bold and italicized terms are elaborated in the range)***
1. Apply System Analysis and Design concepts	1.1.Constraints of a system standard are identified as per work procedures.
	1.2.Properties of a system are identified as per work procedures.
	1.3.Elements of a system are identified as per work procedures.
	1.4.Classification of systems is done as per work procedures.
	1.5.Types of information system are identified as per work procedures.
	1.6.System models are identified as per work procedures.
	1.7.Categories of Information are identified as per work procedures
	1.8.System analysis and design concepts are applied as per user needs
2. Apply approaches to system Development and Project plan	2.1.System development approaches are identified as per work procedures.
	2.2.***System development life cycle models*** are identified as per work procedures.
	2.3.Activities involved in SDLC are identified as per work procedures.
	2.4.***SDLC phases*** are identified as per work procedures.
	2.5.Project planning and system development approaches are applied as per user needs.

ELEMENT These describe the key outcomes which make up workplace functions	PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements ***(Bold and italicized terms are elaborated in the range)***
3. Perform System Analysis	3.1. Overview of system analysis is determined according to work procedures.
	3.2. ***Attributes of structured analysis*** are identified as per user needs.
	3.3. Tools and techniques of system analysis are identified according to work procedures.
	3.4. System analysis activities are performed as per user need.
4. Perform System Design	4.1. Software requirements specification (SRS) document is prepared as per user needs.
	4.2. ***Components of system design*** are identified based SRS document
	4.3. Inputs and outputs of System Design are identified as per SRS document.
	4.4. Types of system design are identified as per system design principles
	4.5. ***Stages of system design*** are identified according to system design principles
	4.6. ***Data Modelling techniques*** are applied as per user needs
5. Perform system testing	5.1. ***Types of the system testing*** are identified as per system requirements.
	5.2. System debugging is performed as per system requirement.
	5.3. System testing is performed as per the test plan

ELEMENT These describe the key outcomes which make up workplace functions	PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements ***(Bold and italicized terms are elaborated in the range)***
	5.4. System test report is developed as per workplace procedure
6. Perform System Implementation	6.1. ***System implementation methods*** are identified as per system implementation standards
	6.2. Appropriate implementation method is selected according to the user needs
	6.3. ***Prerequisite implementation procedures*** are performed as per the user needs
	6.4. System is deployed according to the selected implementation method procedure
7. Perform system maintenance	7.1. System reviewed according to the organization policy
	7.2. System maintenance is performed according to the review outcome
	7.3. System maintenance report is developed as per workplace procedures

RANGE

This section provides work environment and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance.

Variable	Range *May include but is not limited to:*
1. System development life	• Waterfall

Variable	Range *May include but is not limited to:*
cycle models may include but are not limited to:	• Prototyping • Dynamic system Development model (DSDM) • Object oriented model
2. SDLC phases may include but are not limited to:	• Planning • Analysis • Design • Testing • Implementation • Maintenance
3. Attributes of structures analysis may include but are not limited to:	• Graphic • Logical • Process division • High level to lower-level approach
4. Components of system design may include but are not limited to:	• Quality • Timeliness • Cost-Effectiveness
5. Stages of system design may include but are not limited to:	• Requirements determination • Requirements specifications • Feasibility Analysis • Final Specifications • Hardware study • System Design
6. Data Modelling techniques may include but are not limited to:	• Conceptual • Relational • Object Oriented
7. Types of the system testing may include but are not limited to:	• Software • Unit • Integration

Variable	Range *May include but is not limited to:*
	• Usability
8. System implementation methods may include but are not limited to:	• Direct • Phased • Piloting • parallel
9. Prerequisite implementation procedures may include but are not limited to:	• User training, data conversion, hardware/software acquisition, personnel recruitment

REQUIRED KNOWLEDGE AND SKILLS

This section describes the knowledge and skills required for this unit of competency.

Required knowledge

1. system design and system Analysis concepts
2. System development Approaches
3. System development methodologies
4. System development life cycle models
5. SDLC phases are identified.
6. Project planning concepts
7. Tools and techniques of system analysis
8. Activities performed during System analysis
9. Components and concepts of system design
10. Data Modelling techniques
11. System implementation procedures
12. Types of the system testing
13. Deployment procedures of the system
14. Types of system maintenance

Required skills

The individual needs to demonstrate the following foundation skills:

- Communications (verbal and written);
- Proficient in ICT
- Time management
- Analytical
- Planning
- Decision making
- Report writing

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and understanding and range.

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Applied System analysis and design concepts as per user needs. 1.2 Identified SDLC phases as per work procedures. 1.3 Performed System analysis activities as per user need. 1.4 Prepared Software requirements specification (SRS) document-based user story. 1.5 Identified components of system design-based SRS document. 1.6 Identified inputs and outputs of System Design as per SRS document. 1.7 Identified types of system design as per system design principles. 1.8 Identified Stages of system design according to system design principles. 1.9 Performed Input design according to system specification 1.10 Identified System Security and control measures as per

	SRS document. 1.11 Performed process design according to system specification. 1.12 Performed Output design according to system specification. 1.13 Developed designed System as per the system design. 1.14 Deployed developed System according to the selected implementation method procedure. 1.15 Performed system maintenance according to the review outcome.
2. Resource implications	The following resources should be provided: 2.1 Appropriately simulated environment where assessment can take place 2.2 Access to relevant work environment 2.3 Resources relevant to the proposed activities or tasks
3. Methods of assessment	Competency may be assessed through: 1.1 Practical 1.2 Projects 1.3 Third Party Reports 1.4 Portfolio of evidence 1.5 Written tests
4. Context of assessment	Competency may be assessed in a workplace or in a simulated workplace
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace job role is recommended.

CORE UNITS OF COMPETENCY

PERFORM COMPUTER ESSENTIALS

ISCED UNIT CODE: 0611 351 01A
TVET CDACC CODE: IT/OS/ICTA/CR/01/4/MA

UNIT DESCRIPTION

This unit covers the competencies required in performing computer essentials. It involves managing computer devices, managing desktop settings, performing file management, managing computer software and performing online jobs.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function	PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range***
1. Manage computer devices	1.1 ***Computer Hardware*** devices are selected as per user requirement.
	1.2 Computer Hardware devices are disassembled as per user requirement.
	1.3 ***Computer Hardware*** devices are assembled as per user requirement.
	1.4 Computer booting process is performed as per Unified Extensible Firmware Interface (UEFI) standards.
	1.5 ***Computer Peripheral*** devices are connected as per user manual.
2. Manage desktop settings	2.1 Desktop icons are customized as per user manual.
	2.2 Desktop date and time are set as per user manual.
	2.3 Desktop configuration settings are performed as per user manual.
3. Perform file management	3.1 Files and folders are created per work specifications
	3.2 Files and folders are transferred between various media as per user requirements
	3.3 File protection is performed as per work specifications
4. Manage computer software	4.1 Data backup media is selected as per work requirements.
	4.2 Data backup is performed as per work requirements
	4.3 ***Computer software*** is installed as per work requirements
	4.4 Computer software is optimized as per software standards
5. Perform online jobs	5.1 ***Online job platforms*** are identified as per the job requirements.

	5.2 Online accounts and profiles are created in accordance with the work requirements.
	5.3 Online jobs are identified according to the bidder's skillset.
	5.4 Online digital identity is managed according to industry best practices.
	5.5 Online job bidding is done as per the specific job requirements.
	5.6 Online tasks are executed according to the job requirements.
	5.7 Personal online payment account is managed in accordance with financial regulations.

RANGE

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

Variable	**Range**
1. Computer hardware may include but not limited to:	Collection of physical parts of a computer system such as; • Computer case, monitor, keyboard, and mouse • All the parts inside the computer case, such as the hard disk drive, motherboard and video card
2. Computer Peripherals may include but not limited to:	Collection of hardware devices connected to the system unit • Printer • Speaker • Mouse • Keyboard • Projector

3. Computer software may include but not limited to:	A collection of instructions or computer tools that enable the user to interact with a *computer*, its hardware, or perform tasks. • Applications • Operating systems • Device drivers • Browsers • Utility programs
4. Online job platforms may include but are not limited to:	• Remotask • Data annotation.tech • Cloudworker • Upwork • Oneforma • Appen

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit of competency.

Required Skills

The individual needs to demonstrate the following skills:

- Communication skills
- Evaluation skills
- Problem solving skills
- Time management
- Data protection laws
- E waste disposal

Required Knowledge

The individual needs to demonstrate knowledge of:

- Computer settings
- Computer hardware selection

- Computer hardware assembly and disassembly
- Software installation
- File handling
- Software reviews forums

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Selected Computer Hardware devices 1.2 Assembled computer hardware 1.3 Disassembled computer hardware 1.4 Desktop settings were customized 1.5 Installed computer software 1.6 Optimized Computer software 1.7 Files and folders are transferred between various media as per user requirements 1.8 Executes online tasks according to the job requirements.
2. Resource Implications	The following resources should be provided: 2.1 Appropriately simulated environment where assessment can take place. 2.2 Access to relevant work environment. 2.3 Resources relevant to the proposed activities or tasks.
3. Methods of assessment	Competency may be assessed through: 3.1 Practical 3.2 Projects 3.3 Third Party Reports 3.4 Portfolio of evidence 3.5 Written tests
4. Context of assessment	Competency may be assessed:

	4.1 On-the-job 4.2 In a simulated work environment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

PERFORM COMPUTER OPERATIONS

ISCED UNIT CODE: 0611 351 02A

TVET CDACC CODE: IT/OS/ICTA/CR/02/4/MA

UNIT DESCRIPTION

This unit covers the competencies required to perform computer operations. It involves processing computerized word documents, manipulating computerized spread sheets,

maintaining computerized databases, prepare Power point presentation, manipulating graphic application and performing online collaboration.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range***
1. Process computerized word document	1.1 Ergonomics risk factors observed as per work place procedures
	1.2 Word document is created as per work requirements
	1.3 Tables are created and manipulated as per work requirements
	1.4 Mail merging is performed as per work requirements
	1.5 ***Word processing Objects*** are inserted as per user requirements
	1.6 List of figures and table of content are generated as per user requirements
2. Manipulate computerized spread sheet	2.1 Spreadsheet workbook is created as per work requirements
	2.2 Cell referencing is performed as per task requirements
	2.3 Formula and ***functions*** are applied as per work requirements
	2.4 Charts are generated as per work requirements
3. Maintain computerised database	3.1 Computerised database user requirements are collected as per work requirements.

	3.2 Computerised database schema are designed as per task requirements.
	3.3 Creation of Computerized database objects as per task requirements.
	3.4 Data manipulation is performed as per task requirements.
4. Prepare Power point presentation	4.1 Power-point slides are created as per work requirements
	4.2 Presentation views are exhibited as per work requirements
	4.3 Animations and transitions are performed as per work requirements
	4.4 Slideshow is Presented as per work requirements
5. Manipulate graphic application	4.5 Identifying graphic design requirements
	4.6 Graphic design created as per task requirements
	4.7 Graphic design published as per the task requirements
6. Perform document production	6.1 Document is printed as per user specifications
	6.2 Documents are scanned as per user specifications
	6.3 Documents are duplicated as per user specifications
7. Perform Online Collaboration	7.1 Identification of Online collaboration tools as per the task requirements
	7.2 Prepare online collaboration as per the task requirements.
	7.3 Apply online collaborative tools as per

	the task requirements.
	7.4 Demonstrating Mobile collaborations as per task requirements

RANGE

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

Variable	Range
1. Word Processing Objects may include but are not limited to:	• Picture • Shapes • Table • Charts
2. Functions may include but are not limited to:	• Sum • Count • Average • Max • Min • Rank
3. Presentation views may include but are not limited to:	These are the methods used to show the presentation to the audience. • Outline • Normal • Slide sorter • Notes page • Reading view
4. Online document processing may include but is not limited to:	Is the use of web-based applications or platforms to create, edit, store, share and collaborate on various types of documents. • Online data entry

	• File conversion • Google documents • E- tasks
5. Online collaboration: This may include but not limited to:	These are the online web-based tools and services performed • Video conferencing • Chatting • Cloud computing • Social media • Online calendar • Mailing

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit of competency.

Required Skills

The individual needs to demonstrate the following skills:

- Communication skills
- Evaluation skills
- Problem solving skills
- Time management

Required Knowledge

The individual needs to demonstrate knowledge of:

- Social media
- Online storage
- Online meetings
- Online data entry
- E-tasks

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Created a word document 1.2 Inserted objects 1.3 Performed mail merging 1.4 Created a table of contents 1.5 Created a workbook 1.6 Performed cell referencing 1.7 Created formula and functions 1.8 Generated charts 1.9 Performed Data manipulation 1.10 Made a presentation 1.11 Created animations and transitions 1.12 Printed a document 1.13 Scanned a document 1.14 Duplicated a document 1.15 Transferred a file online 1.16 Processed a document online 1.17 Performed online collaboration
Resource Implications	The following resources should be provided: 2.1 Access to relevant workplace where assessment can take place 2.2 Appropriately simulated environment where assessment can take place
Methods of Assessment	Competency may be assessed through: 3.1 Demonstration 3.2 Practical assignment 3.3 Oral Questioning 3.4 Written Test
Context of Assessment	Competency may be assessed: 4.1 On-the-job 4.2 In a simulated work environment

Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

PERFORM COMPUTER NETWORK SETUP

ISCED UNIT CODE: 0612 351 03A

TVET CDACC CODE: IT/OS/ICTA/CR/03/4/MA

UNIT DESCRIPTION

This unit covers the competencies required in setup computer network. It involves the ability to terminate network cables, connect network cables and perform computer network Maintenance.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range***
1. Terminate Computer network cables	1.1 Network devices are selected as per technical requirements
	1.2 Network Cable trunking is performed as per work requirements
	1.3 Network ***Cable termination*** is performed as per work requirements
2. Connect Computer network cables	2.1 ***Safety measures*** are observed as per workplace procedure.
	2.2 Setting up ***Network devices*** is performed as per work requirements
	2.3 Network Cable testing is performed as per work requirements
	2.4 Network Cable connection performed as per ***networking standards***
	2.5 Network connection is established as per networking standards

	2.6 Network testing is performed as per work requirements
3. Perform Computer Network Maintenance	3.1 Computer network is monitored as per work requirement
	3.2 Computer network troubleshooting is performed as per networking standards
	3.3 Computer network is optimized as per networking standards.

RANGE

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

Variable	**Range**
1. Cable termination may include but is not limited to:	Is the enabling the physical and electrical interconnection of two cable ends, or a cable and a terminal equipment. • Cable stripping • Colour coding • Cable crimping
2. Safety measures may include but are not limited to:	Personal Protective Equipment: • Overall/apron/dust coat • Gloves • Safety boots • Ergonomics • First AID kit
3. Network devices may include but not limited to:	Are electronic devices which are required for communication and interaction between devices on a computer network Computer • Router • Switch • Bridge • Hub

	• Patch panels • Access point
4. Network standards may include but are not limited to;	Rules for data communications that are needed for interoperability of networking technologies and processes • HTTP • IEEE 802.1 • TCP/IP

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit of competency.

Required Skills

The individual needs to demonstrate the following skills:

- Analytical skills
- Troubleshooting skill
- Communication
- Basic ICT skills

Required Knowledge

The individual needs to demonstrate knowledge of:

- Networking concepts
- Networking policies and standards
- Technology underlying cyber-attacks and networks
- Computer crimes
- Laws governing protection of ICT
- Emerging trends and issues in ICT;
    - Cyber security
    - Network automation
    - Cloud migration
    - Artificial intelligence
    - Internet of Things

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Performed cable trunking 1.2 Terminated network cable 1.3 Performed cable testing 1.4 Set up network devices 1.5 Established network connection 1.6 Performed network troubleshooting. 1.7 Created a network report
2. Resource Implications	The following resources should be provided: 2.1 Access to relevant workplace where assessment can take place 2.2 Appropriately simulated environment where assessment can take place
3. Methods of Assessment	Competency may be assessed through: 3.1 Demonstration 3.2 Practical assignment 3.3 Oral Questioning 3.4 Demonstration 3.5 Written Test
4. Context of Assessment	Competency may be assessed: 4.1 On-the-job 4.2 In a simulated work environment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

PERFORM COMPUTER REPAIR AND MAINTENANCE

ISCED UNIT CODE: 0714 351 04A

TVET CDACC CODE: IT/OS/ICTA/CR/04/4/MA

UNIT DESCRIPTION:

This unit covers the competencies required for performing computer repair and maintenance. It involves performing computer troubleshooting, repairing faulty components, testing computer component functionality and performing computer maintenance.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace functions	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***(Bold and italicized terms are elaborated in the range)***
1. Perform computer troubleshooting	1.1 User data is assessed as per workplace procedures.
	1.2 Computer problems are identified as per the assessed user data.
	1.3 Solution to the problem is determined as per workplace procedure.
2. Repair faulty components.	2.1 ***Computer components*** for replacement are selected as per the workplace procedure.
	2.2 ***Tools*** **for repairing or replacing** are assembled as per the workplace procedure.
	2.3 ***Safety procedures*** are observed as per workplace procedures.
	2.4 Faulty computer components are repaired or replaced as per the manufacturer's manual.
	2.5 Obsolete or faulty computer components are ***disposed*** as per workplace procedures.

ELEMENT These describe the key outcomes which make up workplace functions	PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements. ***(Bold and italicized terms are elaborated in the range)***
3. Test computer component functionality	3.1 Computer is switched on for POST test as per workplace procedure.
	3.2 Computer component test is performed as per workplace procedure.
	3.3 Computer component's functionality report is generated as per workplace procedure.
4 Perform computer maintenance	4.1 Computer maintenance is scheduled as per the workplace procedure.
	4.2 Computer maintenance is performed as per the workplace procedure.
	4.3 Computer maintenance report is generated as per workplace procedure.

RANGE

Variable	Range
1. Computer components may include but are not limited to:	• Input components. • Output components. • Storage components • Processing components • Communication components
2. Safety procedures may include but are not limited to:	Personal Protective Equipment: • Overall/apron/dust coat • Antiglare screens • Dust mask • Gloves

Variable	Range
	• Safety boots • Antistatic equipment • Antistatic wrist strap • Antistatic mat • Antistatic gloves • Ergonomics • First AID kit
3. Tools for repairing or replacing may include but are not limited to:	• Straight-head screwdriver, large and small • Phillips-head screwdriver, large and small • Tweezers or part retriever • Needle-nosed pliers • Wire cutters • Chip extractor • Hex wrench set • Torx screwdriver
4. Disposed may include but are not limited to:	• E- waste • Pollution • Hazards • Disposal methods

REQUIRED KNOWLEDGE AND SKILLS

This section describes the knowledge and skills required for this unit of competency.

Required knowledge

The individual needs to demonstrate knowledge of:

- Troubleshooting techniques
- Procedures and techniques for reassembling
- Component testing techniques
- Computer systems and their components

- The manufacturer's warranty requirements relating to activities for the computer and related components.
- Types of Computer/component testing
- Types of Maintenance techniques

Required skills

The individual needs to demonstrate the following skills:

- Communications skills
- Proficient in ICT
- Time management
- Faults troubleshooting
- Problem solving
- Planning
- First aid
- Critical thinking

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and understanding and range.

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Identified computer problems as per the assessed user data. 1.2 Determined solution to the problem as per workplace procedure. 1.3 Selected computer components for replacement as per the workplace procedure. 1.4 Assembled tools for repairing or replacing as per the workplace procedure. 1.5 Repaired or replaced faulty computer components as per the manufacturer's manual. 1.6 Performed computer component test as per workplace

	procedure. 1.7 Performed computer maintenance as per the workplace procedure.
2. Resource implications	The following resources should be provided: 2.1 Appropriately simulated environment where assessment can take place. 2.2 Access to relevant work environment. 2.3 Resources relevant to the proposed activities or tasks.
3. Methods of assessment	Competency may be assessed through: 3.1 Practical 3.2 Projects 3.3 Third Party Reports 3.4 Portfolio of evidence 3.5 Written tests
4. Context of Assessment	Competency may be assessed in a workplace or in a simulated workplace
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace job role is recommended.

INSTALL COMPUTER SOFTWARE

ISCED UNIT CODE: 0619 451 06A

TVET CDACC CODE: IT/OS/ICTA/CR/01/5/MA

UNIT DESCRIPTION

This unit covers the competencies required to install computer software. It involves installing computer software, testing computer software functionality and performing software maintenance.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace functions	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***(Bold and italicized terms are elaborated in the range)***
1. Install Computer software	1.1 Computer software identified as per user need.
	1.2 Computer software selected as per workplace procedure.
	1.3 Local user accounts are created as per the workplace procedures
	1.4 Data Backup performed as per work procedure.
	1.5 Computer Software is installed as per software installation manual.
	1.6 Computer Software is configured as per software installation manual.
2. Test computer software functionality.	2.1 Software testing is performed as per user manual.
	2.2 Corrective measures are performed as per user requirements.
	2.3 Computer software functionality is confirmed as per workplace procedures
3. Perform software maintenance.	3.1 ***Software maintenance*** schedule is adopted as per workplace procedure.
	3.2 Software functionality is monitored as per workplace procedure.
	3.3 Software upgrade is conducted as per installation guide.
	3.4 Software update is conducted as per the workplace procedures.

ELEMENT These describe the key outcomes which make up workplace functions	PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements. ***(Bold and italicized terms are elaborated in the range)***
	3.5 ***Safety procedures*** are observed as per workplace procedures.

RANGE

This section provides work environment and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance.

Variable	Range
1. Software maintenance may include but are not limited to:	• Adaptive • Perfective • Preventive • Corrective
2. Safety procedures may include but are not limited to:	• Personal Protective Equipment: • Overall/apron/dust coat • Antiglare screens • Gloves

REQUIRED KNOWLEDGE AND SKILLS

This section describes the knowledge and skills required for this unit of competency.

Required Knowledge

The individual needs to demonstrate knowledge of:

- Troubleshooting techniques
- Testing techniques
- Computer systems and their components
- The manufacturer's warranty requirements relating to activities for the computer and related components
- Types of Maintenance techniques

Required skills

The individual needs to demonstrate the following skills:

- Problem solving skills
- Communication skills
- Time management
- Critical thinking

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills range.

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1. Selected computer software as per user needs. 1.2.Installed computer Software as per software installation manual. 1.3.Configured computer Software according to software installation manual. 1.4.Conducted software upgrade according to installation guide. 1.5.Conducted software update as per the workplace procedures. 1.6.Confirmed Computer software functionality as per workplace procedures
2. Resource implications	The following resources should be provided: 2.1 Appropriately simulated environment where assessment can take place. 2.2 Access to relevant work environment 2.3 Resources relevant to the proposed activities or tasks

3. Methods of assessment	Competency may be assessed through: 3.1 Practical 3.2 Projects 3.3 Third Party Reports 3.4 Portfolio of evidence 3.5 Written tests
4. Context of assessment	Competency may be assessed in a workplace or in a simulated workplace
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace job role is recommended.

PERFORM NETWORK DESIGN AND MANAGEMENT

ISCED UNIT CODE: 0612 451 07A

TVET CDACC CODE: IT/OS/ICTA/CR/02/5/MA

UNIT DESCRIPTION

This unit covers the competencies required to perform network design and management**.** It involves designing computer network, installing computer network, testing computer network and performing computer network maintenance.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace functions	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements ***(Bold and italicized terms are elaborated in the range)***
1. Design computer network	1.1 User needs are collected as per the workplace procedure.
	1.2 Physical network design is developed as per user requirements.
	1.3 Logical network design is developed as per user requirements.
	1.4 Computer network design is mapped out as per user requirements.
2. Install computer network	2.1 ***Safety measures*** are observed as per workplace procedure.
	2.2 ***Computer network components*** are identified as per the network design.
	2.3 Computer network is set up as per the network design.
	2.4 Computer network is configured as per the network design.
	2.5 Computer network is documented as per the network design.
	2.6 Computer network components are ***disposed*** as per workplace procedures.

ELEMENT These describe the key outcomes which make up workplace functions	PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements ***(Bold and italicized terms are elaborated in the range)***
3. Test computer network	3.1 ***Network testing tools*** and equipment are identified as per the work requirement.
	3.2 Network components are tested as per the workplace procedure.
	3.3 Network testing report is developed as per the work requirement.
4. Perform computer network maintenance.	4.1 Computer network maintenance schedule is prepared as per workplace procedure.
	4.2 Computer network is monitored as per maintenance schedule.
	4.3 Computer network is optimized as per the user requirements.
	4.4 Computer network maintenance report is developed as per workplace procedure.

RANGE

This section provides work environment and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance.

Variable	Range
1. Computer network components may include but are not limited to:	• Hubs • Switches • Routers • Modem • Repeaters
2. Network testing tools may include but are not limited to:	• Ping • Traceroute • Cable tester • Wireshark
3. Safety measures may include but are not limited to:	Personal Protective Equipment: • Overall/apron/dust coat • Antiglare screens • Dust mask • Gloves • Safety boots • Antistatic equipment • Ergonomics • First AID kit
4. Disposed may include but are not limited to:	• E- waste • Pollution • Hazards • Disposal methods

REQUIRED KNOWLEDGE AND SKILLS

This section describes the knowledge and skills required for this unit of competency.

Required Knowledge

The individual needs to demonstrate knowledge of:

- System analysis and design
- Documentation processes
- Computer and devices settings
- Cyber security threats and measures
- Technology trends in computer networking
- Troubleshooting techniques
- Types of Maintenance techniques
- Data protection laws

Required skills

The individual needs to demonstrate the following skills:

- Report Writing
- Data collection
- Analytical skills
- Problem solving skills
- Communication skills
- Time management
- Critical thinking

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills range.

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1.Developed ***network design*** as per users' requirements. 1.2.Set up computer network as per the network design. 1.3.Configured computer network as per the network design. 1.4.Tested network components as per the workplace procedure. 1.5.Optimized computer network as per the user requirements.

2. Resource implications	The following resources should be provided: 2.1. Appropriately simulated environment where assessment can take place. 2.2. Access to relevant work environment. 2.3. Resources relevant to the proposed activities or tasks.
3. Methods of assessment	Competency may be assessed through: 3.1 Practical 3.2 Projects 3.3 Third Party Reports 3.4 Portfolio of evidence 3.5 Written tests
4. Context of assessment	Competency may be assessed in a workplace or in a simulated workplace.
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace job role is recommended.

MANAGE COMPUTERIZED DATABASE SYSTEMS

ISCED UNIT CODE: 0612 451 08A

TVET CDACC CODE: IT/OS/ICTA/CR/03/5/MA

UNIT DESCRIPTION

This unit covers the competencies required to manage computerized database systems. It involves designing computerized database, creating computerized database, manipulating computerized database, testing computerized database and maintaining computerized database.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace functions	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements ***(Bold and italicized terms are elaborated in the range)***
1. Perform website Application user need analysis	1.1 Website user requirements are identified as per the user needs.
	1.2 Website user requirements specifications process is documented as per the user needs.
	1.3 Website user requirement specifications are reviewed as per user need report.
2. Design website application	2.1 ***Website application design tools*** are selected as per user needs.
	2.2 ***Website application design methods*** are implemented as per the user needs.
	2.3 ***Website application visual hierarchy*** is developed as per the user needs.
	2.4 Website application site map is created as per the user needs.

ELEMENT These describe the key outcomes which make up workplace functions	PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements ***(Bold and italicized terms are elaborated in the range)***
3. Develop website application	3.1 Front-end web pages are created as per website application design.
	3.2 Website backend is created as per website application design.
	3.3 Website application is integrated to the backend as per workplace procedure.
4. Host the website application	4.1 Website application hosting platform is selected as per host requirements.
	4.2 Server environment is setup as per host requirements.
	4.3 Website application files are uploaded as per host requirements.
	4.4 Website server is configured as per host requirements.
5. Test the website application	5.1 Website application test plan is developed as per the workplace procedures.
	5.2 ***Website application testing techniques*** are selected as per the workplace procedures.
	5.3 Website application is tested as per workplace procedures.
	5.4 Test report is developed as per workplace procedures.
6. Maintain the website application.	6.1 Website is monitored as per workplace procedures.
	6.2 Monitoring report is developed as per workplace procedures.
	6.3 Website application bugs are fixed as per monitoring report.
	6.4 Website application is updated as per the workplace procedures.
	6.5 Website is backed up in accordance with workplace procedures.

RANGE

This section provides work environment and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance.

Variable	Range
1. Database models may include but are not limited to:	• Network • Hierarchical • Relational • Object oriented
2. Database objects may include but are not limited to:	• Forms • Tables • Reports • Queries • Macros
3. Data relationships may include but are not limited to:	• One to one • One to many • Many to many

REQUIRED KNOWLEDGE AND SKILLS

This section describes the knowledge and skills required for this unit of competency.

Required Knowledge

The individual needs to demonstrate knowledge of:

- System analysis and design
- Documentation processes
- Computer and devices settings
- Cyber security threats and measures
- Technology trends in computerized database
- Techniques of distribution and monetizing of computerized database.
- Troubleshooting techniques

- Types of Maintenance techniques
- Data protection laws

Required skills

The individual needs to demonstrate the following skills:

- Report Writing
- Data collection
- Analytical skills
- Problem solving skills
- Communication skills
- Time management
- Critical thinking

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills range.

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1.Developed computerized ***database models*** as per user needs. 1.2.Designed computerized database as per user requirements. 1.3.Developed computerized database as per the computer database design. 1.4.Populated computerized database as per the workplace procedure. 1.5.Retrieved data as per the workplace requirement. 1.6.Tested computerized database as per the work requirement. 1.7.Optimized computerized database as per the user requirements.

2. Resource implications	The following resources should be provided: 2.1 Appropriately simulated environment where assessment can take place. 2.2 Access to relevant work environment 2.3 Resources relevant to the proposed activities or tasks
3. Methods of assessment	Competency may be assessed through: 3.1 Practical 3.2 Projects 3.3 Third Party Reports 3.4 Portfolio of evidence 3.5 Written tests
4. Context of assessment	Competency may be assessed in a workplace or in a simulated workplace
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace job role is recommended.

DEVELOP WEBSITE APPLICATION

ISCED UNIT CODE: 0613 551 03A

TVET CDACC CODE: IT/OS/ICTA/CR/01/6/MA

UNIT DESCRIPTION

This unit covers the competencies required to develop back-end website application. It involves performing website user need analysis, designing website, developing the website, testing the website, hosting the website and maintaining the website.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace functions	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements ***(Bold and italicized terms are elaborated in the range)***
7. Perform website Application user need analysis	1.4 Website user requirements are identified as per the user needs.
	1.5 Website user requirements specifications process is documented as per the user needs.
	1.6 Website user requirement specifications are reviewed as per user need report.
8. Design website application	8.1 ***Website application design tools*** are selected as per user needs.
	8.2 ***Website application design methods*** are implemented as per the user needs.
	8.3 ***Website application visual hierarchy*** is developed as per the user needs.
	8.4 Website application site map is created as per the user needs.
9. Develop website application	3.4 Front-end web pages are created as per website application design.

ELEMENT These describe the key outcomes which make up workplace functions	PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements ***(Bold and italicized terms are elaborated in the range)***
	3.5 Website backend is created as per website application design.
	3.6 Website application is integrated to the backend as per workplace procedure.
10. Host the website application	10.1 Website application hosting platform is selected as per host requirements.
	10.2 Server environment is setup as per host requirements.
	10.3 Website application files are uploaded as per host requirements.
	10.4 Website server is configured as per host requirements.
11. Test the website application	11.1 Website application test plan is developed as per the workplace procedures.
	11.2 ***Website application testing techniques*** are selected as per the workplace procedures.
	11.3 Website application is tested as per workplace procedures.
	11.4 Test report is developed as per workplace procedures.
12. Maintain the website application.	6.6 Website is monitored as per workplace procedures.
	6.7 Monitoring report is developed as per workplace procedures.
	6.8 Website application bugs are fixed as per monitoring report.
	6.9 Website application is updated as per the workplace procedures.
	6.10 Website is backed up in accordance with workplace procedures.

RANGE

This section provides work environment and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance.

Variable	Range
1. Website application design tools may include but are not limited to:	• Figma • WordPress • Wix • Adobe Dreamweaver
2. Website application design methods may include but are not limited to:	• User-Centered Design • Visual Design • Interaction Design • Wireframing and Prototyping
3. Website application visual hierarchy may include but are not limited to:	• Graphical user interface • Hierarchy of Elements • Typography • Color • Spacing and Layout
4. Website application testing techniques may include but are not limited to:	• Functionality • Black box • Regression • unit

REQUIRED KNOWLEDGE AND SKILLS

This section describes the knowledge and skills required for this unit of competency.

Required Knowledge

The individual needs to demonstrate knowledge of:

- Documentation processes
- Computer and devices settings
- Technology trends in develop website systems
- Troubleshooting techniques
- Types of maintenance techniques

- Data protection laws

Required skills

The individual needs to demonstrate the following skills:

- Report Writing
- Data collection
- Analytical skills
- Problem solving skills
- Communication skills
- Time management
- Critical thinking

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills range.

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Documented website user requirements specifications process as per the user needs. 1.2 Developed ***website application visual hierarchy*** as per the user needs. 1.3 Created website application site map as per the user needs. 1.4 Created front end web pages per website application design. 1.5 Created back-end web pages as per website application design. 1.6 Integrated website application to the backend as per workplace procedure. 1.7 Uploaded website application files as per host requirements. 1.8 Configured website server as per host requirements. 1.9 Fixed website application bugs as per monitoring report. 1.10 Updated website application as per the workplace procedures.

2. Resource implications	The following resources should be provided: 2.1 Appropriately simulated environment where assessment can take place. 2.2 Access to relevant work environment. 2.3 Resources relevant to the proposed activities or tasks.
3. Methods of assessment	Competency may be assessed through: 3.1 Practical 3.2 Projects 3.3 Third Party Reports 3.4 Portfolio of evidence 3.5 Written tests
4. Context of assessment	Competency may be assessed in a workplace or in a simulated workplace.
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace job role is recommended.

MANAGE ICT SECURITY

ISCED UNIT CODE: 0612 551 04A

TVET CDACC CODE: IT/OS/ICTA/CR/02/6/MA

UNIT DESCRIPTION

This unit covers the competencies required to manage ICT security. It involves assessing security needs, installing security control measures and maintaining ICT system security.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace functions	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements ***(Bold and italicized terms are elaborated in the range)***
1. Assess security needs	1.1 ***ICT security assets*** are documented based on organization's policy.
	1.2 ***ICT security threats*** are identified as per organization policy.
	1.3 ICT security risk impact assessment is performed as per industry standards.
	1.4 ICT security risk assessment report is compiled as per risk impact assessment performed.
2. Install security control measures	2.1 ***Physical control measures*** are implemented according to the organisation ICT security policy.
	2.2 ***Logical security control measures*** are implemented according to the organisation ICT security policy.
	2.3 ICT security control measures implemented are tested according to the organization ICT security policy.
3. Maintain ICT system security	3.1 ICT system security regular monitoring is carried out as per the organization policy.
	3.2 ICT system security monitoring report is prepared as per the organisation policy.

	3.3 ICT system security is updated as per the monitoring report.

RANGE

This section provides work environment and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance.

Variable	**Range** *May include but not limited to:*
1. ICT security assets may include but are not limited to:	• Software • Hardware • Firmware • Data
2. ICT security threats may include but are not limited to:	• Malware • Virus • Phishing • Hacking • Denial of service
3. Physical control measures may include but are not limited to:	• Grills • Security guards • Firewall • Locks
4. Logical security control measures may include but are not limited to:	• Firewall • Password policy • Encryption • Authentication • Access right policy

REQUIRED KNOWLEDGE AND SKILLS

This section describes the knowledge and skills required for this unit of competency.

Required Knowledge

The individual needs to demonstrate knowledge of:

- Documentation processes
- Computer and devices settings
- Cyber security threats and measures
- Technology trends in manage ICT threats
- Troubleshooting techniques
- Types of maintenance techniques
- Data protection laws

Required skills

The individual needs to demonstrate the following skills:

- Report Writing
- Data collection
- Analytical skills
- Problem solving skills
- Communication skills
- Time management
- Critical thinking

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills range.

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Identified ***ICT security threats*** as per organization policy. 1.2 Implemented ***Physical control measures*** according to the organisation ICT security policy. 1.3 Implemented ***Logical security control measures*** according to the organisation ICT security policy. 1.4 Monitored ICT security system as per the organization policy. 1.5 Updated ICT security system as per the monitoring report.

2. Resource implications	The following resources should be provided: 4.1.Appropriately simulated environment where assessment can take place. 4.2.Access to relevant work environment. 4.3.Resources relevant to the proposed activities or tasks.
3. Methods of assessment	Competency may be assessed through: 5.1 Practical 5.2 Projects 5.3 Third Party Reports 5.4 Portfolio of evidence 5.5 Written tests
4. Context of assessment	Competency may be assessed in a workplace or in a simulated workplace.
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace job role is recommended.

DEVELOP DESKTOP APPLICATION

ISCED UNIT CODE: 0613 551 05A

TVET CDACC CODE: IT/OS/ICTA/CR/03/6/MA

UNIT DESCRIPTION

This unit covers the competencies required to develop desktop application. It involves assessing desktop application requirements, designing desktop application, creating desktop application, deploying desktop application and maintaining desktop application.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace functions	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements ***(Bold and italicized terms are elaborated in the range)***
1. Assess desktop application requirements.	1.1 Desktop application requirements are identified as per the user needs.
	1.2 Desktop application requirements specifications process is documented as per the user needs.
	1.3 Desktop application requirements specifications are reviewed as per user need report.
2. Design desktop application.	2.1 Desktop application design requirements are identified as per user needs.
	2.2 Desktop application design methods are implemented as per requirements specifications document
	2.3 Desktop application visual hierarchy is developed as per the design method
3. Create desktop application.	3.1 Desktop application development environment is set up as per the user manual.
	3.2 Desktop application ***programming fundamentals*** are applied as per the workplace procedures.

ELEMENT These describe the key outcomes which make up workplace functions	PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements ***(Bold and italicized terms are elaborated in the range)***
	3.3 Desktop application is developed as per design methods
	3.4 Desktop application is tested as per the workplace procedures.
	3.5 Desktop application is optimized as per the workplace procedures.
4. Deploy desktop application	4.1 Desktop application is packaged as per user the workplace procedures.
	4.2 Desktop application deployment plan is developed as per the user requirements.
	4.3 Desktop application is installed per the workplace procedures.
	4.4 Desktop application user training is conducted as per workplace procedures.
5. Maintain desktop application.	5.1 Desktop application maintenance schedule is prepared as per workplace procedure.
	5.2 Desktop application maintenance is performed as per application maintenance schedule.
	5.3 Desktop application maintenance report is developed as per work procedure

RANGE

This section provides work environment and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance.

Variable	Range
1. Desktop application design methods may include but are not limited to:	• User-centred Design • Visual Design

Variable	Range
	• Interaction Design • Wireframing and Prototyping
2. Desktop application programming fundamentals may include but are not limited to:	• Basic syntax • Variables • Data types • Control structures • Objects • Functions • Data structures • Debugging
3. Desktop application visual hierarchy may include but are not limited to:	• Graphical user interface • Hierarchy of Elements • Typography • Colour • Spacing and Layout

REQUIRED KNOWLEDGE AND SKILLS

This section describes the knowledge and skills required for this unit of competency.

Required Knowledge

The individual needs to demonstrate knowledge of:

- Documentation processes
- Computer and devices settings
- Technology trends in desktop application
- Troubleshooting techniques
- Types of maintenance techniques
- Data protection laws

Required skills

The individual needs to demonstrate the following skills:

- Report Writing
- Data collection
- Analytical skills
- Problem solving skills
- Communication skills
- Time management
- Critical thinking

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills range.

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Desktop application requirements specifications process is documented as per the user needs. 1.2 ***Desktop application visual hierarchy*** is developed as per the design method. 1.3 Desktop application is developed as per design methods. 1.4 Desktop application is optimized as per the workplace procedures 1.5 Desktop application is installed per the workplace procedures. 1.6 Desktop application is packaged as per user the workplace procedures. 1.7 Desktop application maintenance is performed as per application maintenance schedule.

2. Resource implications	The following resources should be provided: 6.1.Appropriately simulated environment where assessment can take place. 6.2.Access to relevant work environment. 6.3.Resources relevant to the proposed activities or tasks.
3. Methods of assessment	Competency may be assessed through: 7.1 Practical 7.2 Projects 7.3 Third Party Reports 7.4 Portfolio of evidence 7.5 Written tests
4. Context of assessment	Competency may be assessed in a workplace or in a simulated workplace.
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace job role is recommended.