COMPETENCY BASED CURRICULUM

FOR

INFORMATION COMMUNICATION TECHNOLOGY

KNQF LEVEL 6

Cycle 3

PROGRAMME CODE: 061 2554A

TVET CDACC

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NAIROBI

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FOREWORD

The provision of quality education and training is fundamental to the Government's overall strategy for social and economic development. Quality education and training contribute to the achievement of Kenya's development blueprint and sustainable development goals.

Reforms in the education sector are necessary to achieve Kenya Vision 2030 and meet the provisions of the Constitution of Kenya 2010. The education sector had to be aligned to the Constitution, and this resulted in the formulation of the Policy Framework for Reforming Education and Training in Kenya (Sessional Paper No. 14 of 2012). A key feature of this policy is the radical change in the design and delivery of TVET training. This policy document requires that training in TVET be competency-based, curriculum development be industry-led, certification be based on demonstration of competence, and the mode of delivery allow for multiple entry and exit in TVET programmes.

These reforms demand that Industry takes a leading role in curriculum development to ensure the curriculum addresses its competence needs. It is against this background that this curriculum has been developed. For trainees to build their skills on foundational hands-on activities of the occupation, units of learning are grouped in modules. This has eliminated duplication of content and streamlined exemptions based on skills acquired as a trainee progresses in the up-skilling process, while at the same time allowing trainees to be employable in the shortest time possible through the acquisition of part qualifications.

It is my conviction that this curriculum will play a great role in developing competent human resources for the ICT Sector's growth and development.

PRINCIPAL SECRETARY

STATE DEPARTMENT FOR TVET

MINISTRY OF EDUCATION

PREFACE

Kenya Vision 2030 aims to transform Kenya into a newly industrializing middle-income country, providing high-quality life to all its citizens by the year 2030. Kenya intends to create globally competitive and adaptive human resource base to meet the requirements of a rapidly industrializing economy through lifelong education and training. TVET has a responsibility to facilitate 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).

TVET Act, CAP 210A and Sessional Paper No. 1 of 2019 on Reforming Education and Training in Kenya for Sustainable Development 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 the Kenyan labour force.

This curriculum has been developed in adherence to the Kenya National Qualifications Framework and CBETA standards and guidelines. The curriculum is designed and organized into Units of Learning with Learning Outcomes, suggested delivery methods, learning resources, and methods of assessing the trainee's achievement. In addition, the units of learning have been grouped in modules to concretize the skills acquisition process and streamline upskilling.

I am grateful to all expert trainers and everyone who played a role in translating the Occupational Standards into this competency-based modular curriculum.

CHAIRPERSON, TVET CDACC

ACKNOWLEDGMENT

This curriculum has been designed for competency-based training and has independent units of learning that allow the trainee flexibility in entry and exit. In developing the curriculum, significant involvement and support were received from expert trainers, institutions and organizations.

I recognize with appreciation the role of the ICT National Sector Skills Committee (NSSC) in ensuring that competencies required by the industry are addressed in the curriculum. I also thank all stakeholders in the ICT sector for their valuable input and everyone who participated in developing this curriculum.

I am convinced that this curriculum will go a long way in ensuring that individuals aspiring to work in the ICT Sector acquire competencies to perform their work more efficiently and effectively.

COUNCIL SECRETARY/CEO

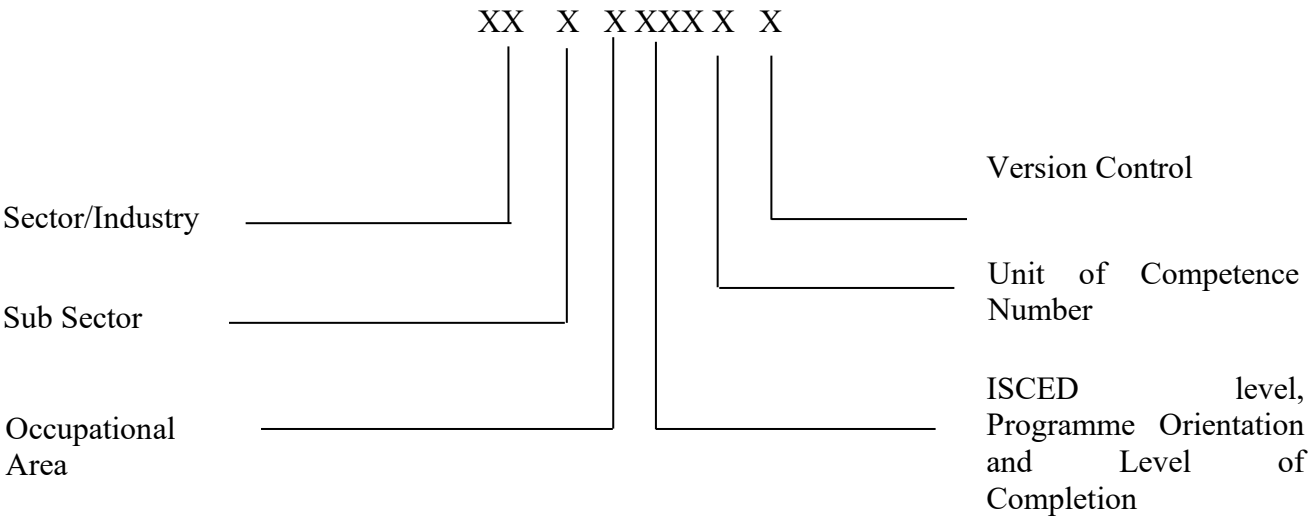
TVET CDACC

TABLE OF CONTENTS

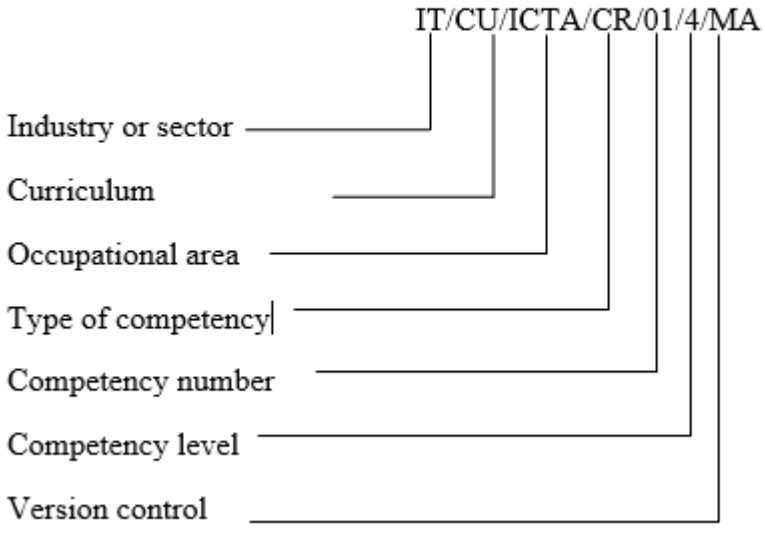
ACRONYMS

CCTV	Closed Circuit Television
ICT	Information Communication Technology
KCSE	Kenya Certificate of Secondary Education
LAN	Local Area Network
PAN	Personal Area Network
POST	Power on Self-Test
PPE	Personal Protective Equipment
MAN	Metropolitan Area Network
SDLC	System Development life cycle
TVET	Technical and Vocational Education and Training
WAN	Wide Area Network
BCD	Binary Coded Decimal
ASCII	American Standard Code for Information Interchange
EBCDIC	Extended Binary Coded Decimal Interchange Code
SQL	Structured Query Language
MySQL	My Structured Query Language
WAMP	Windows, Apache MySQL and PHP
IP	Internet Protocol
TCP	Transport Control Protocol
IPV4	Internet Protocol Version 4
IPV6	Internet Protocol Version 6
OSI	Open System Interconnection
VLANS	Virtual Local Area Network
SSID	Service Set Identifier
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
SMTP	Simple Mail Transfer Protocol

KEY TO UNIT CODE



KEY TO TVET CDACC UNIT CODE



COURSE OVERVIEW

The ICT Technician Level 6 curriculum 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 performing computer essentials, performing computer operations, performing computer network setup, performing computer repair and maintenance, installing computer software, performing computer networking, developing website systems, managing ICT security and developing desktop application.

SUMMARY OF UNITS OF LEARNING

Unit Code	**TVET CDACC UNIT CODE**	**Units Title**	**Unit Duration (Hours)**	**Credit Factor**
MODULE I				
0611 351 01A	IT/CU/ICTA/CR/01/4/MA	Computer Essentials	120	12
0611 351 02A	IT/CU/ICTA/CR/02/4/MA	Computer Operations	150	15
Sub-Total Hours			**270**	**27**
MODULE II				
0612 351 03A	IT/CU/ICTA/CR/03/4/MA	Computer Network Setup	200	20
0714 351 04A	IT/CU/ICTA/CR/04/4/MA	Computer Repair and Maintenance	200	20
Sub-Total Hours			**400**	**40**
MODULE III				
0714 441 04A	IT/CU/ICTA/CC/01/5/MA	Basic Electronics	100	10
0619 451 06A	IT/CU/ICTA/CR/01/5/MA	Computer Software	160	16
0417 441 02A	IT/CU/ICTA/BC/01/5/MA	Work Ethics and Practice	40	4

0612 451 07A	IT/CU/ICTA/CR/02/5/MA	Network Design and Management	160	16
Sub-Total Hours			**460**	**46**
MODULE IV				
0613 451 05A	IT/CU/ICTA/CC/02/5/MA	Computer Programming Principles	180	18
0612 451 08A	IT/CU/ICTA/CR/03/5/MA	Computerized Database System	200	20
0031 441 01A	IT/CU/ICTA/BC/01/5/MA	Communication Skills	40	4
0413 441 03A	IT/CU/ICTA/BC/02/5/MA	Entrepreneurial Skills	40	4
	Sub Total		**460**	**46**
	MODULE V			
0541541 01A	IT/CU/ICTA/CC/01/6/MA	Discrete Mathematical Concepts	120	12
0613 541 02A	IT/CU/ICTA/CC/02/6/MA	System Analysis and Design	120	12
0613 551 03A	IT/CU/ICTA/CR/01/6/MA	Website Application	220	22
	Sub Total		**460**	**46**
	MODULE VI			
0612 551 04A	IT/CU/ICTA/CR/02/6/MA	ICT Security Management	150	15
0613 551 05A	IT/CU/ICTA/CR/03/6/MA	Desktop Application	280	28
	Sub Total		**430**	**46**
	Industry Training		480	48
	GRAND TOTAL		**2,960**	**2,960**

Entry Requirements

An individual entering this course should have any of the following minimum requirements:

a) Kenya Certificate of Secondary Education (KCSE) mean grade C-(minus),

   or

b) KNQF level 5 ICT or related course qualification

   Or

c) Equivalent qualification as determined by TVETA

Trainer Qualification

A trainer for any of the Units of Competency in this course must:

a) Have at least a minimum of ICT Technician KNQF Level 7 qualification or its equivalent in a trade area related to this course.
b) Be registered by TVETA.

Industry Training

An individual enrolled in this course will be required to undergo Industry training for a minimum period of 480 hours in ICT sector. The industrial training may be taken after completion of all units for those pursuing the full qualification or be distributed equally in each unit for that pursuing part qualification. In the case of dual training model, industrial training shall be as guided by the dual training policy.

Assessment

The course will be assessed both in formative and summative as follows:

a) During formative assessment all performance criteria shall be assessed based on performance criteria weighting.
b) Summative assessment shall focus on critical aspects of the Unit of competency.
c) Theoretical and practical weighting for each unit of learning shall be as follows
   i. 10 : 90 for unit in module I and module II
   ii. 30:70 for the units in module III and module IV.
   iii. 40:60 for units in module V and module VI.

d) Formative and summative assessment weights shall constitute 60% and 40% of the overall score respectively.

e) For a candidate to be declared competent in a unit of competency, the candidate must meet the following conditions:

   i) Obtained at least 50% in theory assessment in formative and summative assessments.

   ii) Obtained at least 50% in practical assessment in formative and summative assessment where applicable.

   iii) Obtained at least 50% in the weighted results between formative assessment and summative assessment where the former constitutes 60% and the latter 40% of the overall score.

f) Assessment performance rating for each unit of competency shall be as follows:

MARKS	COMPETENCE RATING
80 -100	Mastery
65 - 79	Proficiency
50 - 64	Competent
49 and below	Not Yet Competent
Y	Assessment Malpractice/irregularities

g) Assessment for Recognition of Prior Learning (RPL) may lead to award of Certificate of Competency

h) The assessors and verifiers must be registered by TVETA.

Certification

A candidate will be issued with a Certificate of Competency upon demonstration of competence in a core Unit of Competency. To be issued with the Kenya National TVET Certificate in ICT Technician level 6, the candidate must demonstrate competence in all the Units of Competency as given in the qualification pack. Statement of Attainment certificate may be awarded upon demonstration of competence in certifiable element within a unit.

These certificates will be issued by TVET CDACC.

MODULE 1

UNIT CATEGORY	ISCED UNIT CODE	TVET CDACC UNIT CODE	UNITS NAME	DURATION (HOURS)
CORE	0611 451 01A	IT/CU/ICTA/CR/01/4/MA	Computer Essentials	120
CORE	0611 451 02A	IT/CU/ICTA/CR/02/4/MA	Computer Operations	150
Total hours				**270**

COMPUTER ESSENTIALS

ISCED UNIT CODE: 0611 351 01A

TVET CDACC UNIT CODE: IT/CU/ICTA/CR/01/4/MA

Duration of unit: 120 hours

Relationship to Occupational Standards

This unit addresses the unit of competency: Perform Computer Essentials

Unit Description

This unit covers the competencies required in performing computer essentials. It involves the ability to: manage computer devices, manage desktop settings, perform file management, manage computer software and perform online jobs.

Summary of Learning Outcomes

Learning Outcomes	Durations(Hours)
1. Manage computer devices	20
2. Manage desktop settings	30
3. Perform file management	20
4. Manage computer software	20
5. To Perform online jobs	30
Total Hours	**120**

Learning outcomes, Content and Suggested Assessment Methods

Learning outcome	Content	Suggested Assessment Methods
1. Manage computer devices	1.1. Selection of Computer Hardware devices 1.1.1. Introduction to computer devices 1.1.1.1. Meaning of computer hardware	• Practical • Oral questions • Written tests

	devices 1.1.1.2. Identification of computer components and port 1.1.2. Computer case, monitor, keyboard, and mouse 1.1.3. All the parts inside the computer case, such as the hard disk drive, motherboard and video cards 1.1.3.1. Classification of computer hardware devices 1.2. Disassembling of computer hardware devices 1.2.1. Cleaning of computer devices 1.3. Assembling of Computer Hardware devices 1.3.1. Types of Computer Hardware devices 1.3.2. Functions of various computer hardware devices 1.3.3. Connecting computer hardware devices e.g. monitor, System Unit 1.4. Booting of computer 1.4.1. Introduction to booting 1.4.2. Types of booting 1.4.2.1. Cold Booting 1.4.2.2. Warm booting 1.5. Connecting computer peripheral devices 1.5.1. Types of computer peripheral devices 1.1.1.1. Printer 1.1.1.2. Speaker 1.1.1.3. Mouse 1.1.1.4. Keyboard 1.1.1.5. Projector 1.5.2. Configuration of peripheral devices	• Observation • Reports • Portfolio of evidence

2. Manage desktop settings	2.1 Customization of desktop icons 2.1.1 Introduction to desktop icons and settings 2.2 Date and time settings 2.3 Desktop settings customization 2.3.1 Background colour and pictures 2.3.2 Themes 2.3.3 Taskbar 2.3.4 Menu bar 2.3.5 Text size 2.3.6 Brightness	• Practical • Oral questions • Written tests • Observation • Reports • Portfolio of evidence
3. Perform file management	3.1 Creating files and folders 3.1.1 Introduction to computer files and folders 3.1.2 Creation of files and folders 3.1.3 Compression and extraction of folders 3.2 Transferring files and folders 3.2.1 sharing of folders and files 3.3 File protection 3.3.1 Password 3.3.2 Encryption	• Practical • Oral questions • Written tests • Observation • Reports • Portfolio of evidence
4. Manage computer software	4.1 Selecting data backup media 4.1.1 Types of data Backup media 4.2 Performing data backup 4.3 Installation of computer software 4.3.1 Introduction to computer software 4.3.2 Types of computer software 4.3.2.1 Applications 4.3.2.2 Operating systems 4.3.2.3 Utility programs 4.3.3 Configuration of computer software 4.4 Optimization of computer software 4.4.1 Updating computer software	• Practical • Oral questions • Written tests • Observation • Reports • Portfolio of evidence

	4.4.2 Computer disk cleanup	
5. Perform Online Jobs	5.1. Introduction to online working 5.1.1. Types of online Jobs 5.1.2. Online job platforms (Upwork, Freelancer, Fiverr) 5.2. Online account and profile management 5.3. Identifying online jobs job bidding 5.4. Online digital identity 5.5. Online job bidding 5.6. Executing online tasks 5.7. Management of online payment accounts.	• Practical Assessment • Project • Third Party Report • Portfolio of Evidence • Written Assessment • Oral Questioning

Suggested Delivery Methods

- Demonstration by trainer
- Practical work by trainee
- Viewing of related videos
- Group discussions
- Direct instructions

Recommended resources for 25 trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Trainee: Item)
A	**Learning Materials**			
1.	Textbooks		5 pcs	5:1
2.	Installation manuals		5 pcs	5:1
3.	Flip Charts		5 pcs	5:1

4.	PowerPoint presentations	For trainer's use		
5.	Installation CDs/DVDs			
B	**Learning Facilities & infrastructure**			
6.	Lecture/theory room		1	25:1
7.	Computer laboratory		1	25:1
C	**Consumable materials**			
8.	Printing papers		1 ream	1:20
9.	Foolscaps		1 ream	1:20
10.	Toners		2 pcs	13:1
11.	Assorted colour of whiteboard markers			
D	**Tools and Equipment**			
12.	Computers		25 pcs	1:1
13.	Projector		1 pcs	25:1
14.	Printers		2 pcs	13:1
15.	Whiteboard		1 pcs	25:1
16.	Flash drives		5 pcs	5:1
17.	External Hard drive		5 pcs	5:1
18.	System Software suite		5 pcs	5:1
19.	Application Software suite		5 pcs	5:1

20.	Computer Repair Tool box		5	5:1

COMPUTER OPERATIONS

ISCED UNIT CODE: 0611 351 02A

TVET CDACC UNIT CODE: IT/CU/ICTA/CR/02/4/MA

Duration of Unit: 150 hours

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Perform Computer Operations

Unit Description

This unit covers the competencies required to perform computer operations. It involves processing computerized word documents, manipulating computerized spreadsheets, maintaining computerized databases, preparing PowerPoint presentation slides, manipulating graphic application and performing online collaboration.

Summary of Learning Outcomes

Learning Outcomes	Durations(Hours)
1. Process computerized word document	30
2. Manipulate computerized spreadsheet	30
3. Maintain computerized database	30
4. Prepare PowerPoint presentation	20
5. Manipulate graphic application	25
6. Perform online collaboration	15
Total Hours:	**150**

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Process computerized word document	1.1 Ergonomics risk factors 1.2 Creation of computerized word document 1.2.1 Introduction to word document 1.2.2 Types of word processors 1.2.3 Creating word document 1.2.4 Editing and formatting word document 1.2.5 Word document editing features 1.2.5.1 Text editing 1.2.5.2 Paragraph editing 1.2.5.3 Document editing 1.2.6 Word document formatting features 1.2.6.1 Text formatting 1.2.6.2 Paragraph formatting 1.2.6.3 Document formatting 1.2.7 Enhancing productivity 1.2.7.1 Set basic options/ preferences 1.2.7.2 Help resources 1.2.7.3 Use magnification/zoom tools 1.2.7.4 Display, hide built-in tool bar 1.3 Creation and manipulation of tables	• Practical assessment • Simulations • Project • Observation Checklist • Product Checklist • Written assessment • Portfolio of evidence

	1.3.1 Inserting tables 1.3.2 Working with tables 1.4 Mail merge 1.5.1 Mail merge preparation 1.5.2 Mail merge output 1.5 Inserting word processing objects 1.5.1 Picture 1.5.2 Shapes 1.5.3 Table 1.5.4 Charts 1.6 Generating list of figures and table of content 1.6.1 List of figures 1.6.2 Table of content 1.7 Printing of computerized word document 1.7.1 Print setup 1.7.2 Printing	
2. Manipulate computerized spreadsheet	2.1 Creation of Computerized spreadsheet workbook 2.1.1 Spreadsheet concepts 2.1.2 Elements of spreadsheet window 2.1.2.1 Worksheet 2.1.2.2 workbook 2.1.2.3 Rows 2.1.2.4 columns 2.1.2.5 Cells 2.2 Cell referencing 2.2.1.1 Relative cell referencing	• Practical assessment • Simulations • Project • Observation Checklist • Product Checklist • Written assessment • Portfolio of evidence

	2.2.1.2 Absolute cell referencing 2.2.1.3 Mixed cell referencing 2.2.2 Spreadsheet editing features 2.2.2.1 Worksheet editing 2.2.2.2 Inserting rows/columns 2.2.2.3 Removing rows/columns 2.2.2.4 Adjusting row heights and column width 2.2.2.5 Inserting worksheets 2.2.2.6 Renaming worksheets 2.2.2.7 Move or copy worksheets 2.2.2.8 Deleting worksheets 2.2.3 Data manipulation in spreadsheets 2.2.3.1 Data entry 2.2.3.2 Types of data 2.3 Formulas and functions 2.3.1.1 Formulas and functions syntax 2.3.1.2 Arithmetic functions	

	2.3.1.3 logical functions 2.3.1.4 Look up functions 2.3.2 Computerized spreadsheet worksheet formatting 2.3.2.1 Font styles 2.3.2.2 Alignment 2.3.2.3 Borders and shading 2.3.2.4 Header and footer 2.4 Charts generation 2.4.1.1 Types of charts 2.4.1.2 Insert charts 2.4.1.3 Labelling and Editing charts 2.4.1.4 Computerized spreadsheet workbook printing 2.4.1.5 Print setup 2.4.1.6 Printing	
3. Maintain computerised database	3.1 Computerised database user requirements collection 3.1.1 Introduction to database 3.1.1.1 Key concepts 3.1.1.2 Database organisation 3.1.1.3 Database relationships 3.1.1.4 Database operations 3.1.2 Collection of User	• Practical assessment • Simulations • Project • Observation Checklist • Product Checklist • Written assessment • Portfolio of evidence

	requirements 3.2 Design Computerised database schema 3.2.1 Creating database models 3.2.1.1 ERD models 3.2.1.2 Relational models 3.3 Creation of Computerised database objects 3.3.1 Database Objects 3.3.1.1 Tables 3.3.1.2 Records 3.3.1.3 Fields 3.3.1.4 Keys 3.3.1.5 Forms 3.3.1.6 Queries 3.3.1.7 Reports 3.4 Data manipulation 3.4.1 Inserting records 3.4.2 Retrieving records 3.4.3 Deleting records 3.4.4 Updating record 3.4.5 Printing database objects 3.4.5.1 Tables 3.4.5.2 Forms 3.4.5.3 Queries 3.4.5.4 Reports	
4. Prepare Power point presentation	4.1 Collecting PowerPoint Presentation requirements 4.1.1 Definition of terms 4.1.2 Presentation requirements 4.1.3 Types of presentation	• Practical assessment • Simulations • Project • Observation Checklist • Product Checklist

	software 4.1.4 Elements of presentation window 4.2 Creating PowerPoint slides 4.2.1 Types of presentation layout 4.2.2 Factors to consider when designing presentation layout 4.2.3 Design a PowerPoint presentation 4.2.4 Create a PowerPoint presentation 4.2.5 Save a PowerPoint presentation 4.3 Exhibit presentation views 4.2.1 Slide views 4.2.2 Working with presentations 4.3.1.1 Switch between open PowerPoint presentations 4.4 Perform animation and transitions 4.4.1 Slide animation 4.4.2 Slide transition 4.5 Manipulation of PowerPoint slides 4.5.1 Adding data/text to a slide 4.5.2 Formatting data/text 4.5.3 Move/copy/delete a slide 4.5.4 Inserting header and footer	• Written assessment • Portfolio of evidence

	4.5.5 Presentation objects 4.5.5.1 Tables 4.5.5.2 Charts 4.6 Printing of PowerPoint slides 4.6.1 Print setup 4.6.2 Printing PowerPoint presentation	
5. Manipulate graphic application	5.1 Identifying graphic design requirements 5.1.1 Definition of terms 5.1.2 Graphic application requirements 5.1.3 Types of graphic application software 5.1.4 Types of publications designs 5.1.4.1 Templates 5.1.4.2 Banners 5.1.4.3 Booklets 5.1.4.4 Brochures 5.1.4.5 Flyers 5.1.4.6 Posters 5.1.4.7 Cards 5.1.4.8 Certificates 5.1.4.9 Magazines 5.1.5 Elements of Graphic application window 5.2 Creation of graphic design 5.2.1 Perform basic tasks using graphic application software	• Practical assessment • Simulations • Project • Written assessment • Portfolio of evidence

	5.2.1.1 Publication type 5.2.1.2 Page setup 5.2.1.3 Ruler/guides 5.2.1.4 Page views 5.2.2 Add content to a publication 5.2.3 Edit content to a publication 5.2.4 Format text and paragraphs in a publication 5.2.5 Page formatting in a publication 5.2.5.1 Columns 5.2.5.2 Borders and shading 5.2.5.3 Headers and footers 5.2.5.4 Background 5.2.5.5 Watermarks 5.2.5.6 Orientation 5.2.6 Work with graphics objects in a publication 5.2.6.1 Textbox 5.2.6.2 Tables 5.2.6.3 Shapes 5.2.6.4 Pictures 5.2.6.5 (PNG, JPEG, GIF) 5.3 Publishing of graphic design 5.3.1 Prepare a publication 5.3.2 Print setup 5.3.3 Printing publication	

6. Perform document production	6.1 Printing documents 6.1.1 Introduction to document production 6.1.2 Types of printers 6.1.3 Document printing 6.2 Document scanning 6.2.1 Types of scanners 6.2.2 Document scanning 6.3 Document duplication	• Practical assessment • Simulations • Project • Observation Checklist • Product Checklist • Written assessment • Portfolio of evidence
7. Perform Online Collaboration	7.1 Identification of Online collaboration tools 7.1.1 Definition of online collaboration 7.1.2 Importance of online collaboration 7.1.3 Factors to consider when choosing an online collaboration tool 7.1.4 Online collaboration tools 7.1.4.1 Microsoft teams 7.1.4.2 Skype 7.1.4.3 Google drive 7.1.4.4 Zoom 7.1.4.5 Google meet 7.1.4.6 Slack 7.2 Online collaboration preparation 7.2.1 Online collaboration key concepts 7.2.2 Common setup features 7.2.2.1 Download software to support online	• Practical assessment • Simulations • Project • Observation Checklist • Product Checklist • Written assessment • Portfolio of evidence

	collaboration tools 7.2.2.2 Register and/ or set a user account 7.2.3 Preparation for online collaboration 7.3 Application of online collaborative tools 7.3.1 Using online collaborative tools 7.3.1.1 Online storage media 7.3.1.2 Using email 7.3.1.2.1 Sending and receiving email 7.3.1.2.2 Tools and settings 7.3.1.2.3 Organizing email 7.3.1.3 Using calendars 7.3.1.4 Online calendars 7.3.1.5 Social media 7.3.1.6 Online learning environment 7.3.1.7 Synchronization tools 7.4 Demonstrating Mobile collaborations 7.4.1 Key concepts in mobile applications 7.4.2 Mobile applications permissions 7.4.3 Synchronization	

Suggested Delivery Methods

- Demonstration by trainer
- Practical work by trainee

- Viewing of related videos
- Group discussions
- Facilitation using active learning strategies

Recommended Resources for 25 Trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Trainee: Item)
A	**Learning Materials**			
1.	Textbooks		5 pcs	5:1
2.	Installation manuals		5 pcs	5:1
3.	Flip Charts		5 pcs	5:1
4.	PowerPoint presentations	For trainer's use		
5.	Magazines/brochures/business cards			
B	**Learning Facilities & infrastructure**			
6.	Lecture/theory room		1	25:1
7.	Laboratory		1	25:1
C	**Consumable materials**			
8.	Printing papers		1 ream	1:20
9.	Foolscaps		1 ream	
10.	Toners/cartridges		2 pcs	13:1
11.	Assorted colour of			

	whiteboard markers			
D	**Tools and Equipment**			
12.	Computers		25 pcs	1:1
13.	Projector		1 pc	25:1
14.	Printers		2 pcs	1:13
15.	Whiteboard		1 pc	25:1
16.	Flash drives		5 pcs	5:1
17.	1 External Hard drive		1 pcs	25:1
18.	Application software suite		5 pcs	5:1

MODULE 2

UNIT CATEGORY	ISCED UNIT CODE	TVET CDACC UNIT CODE	UNITS NAME	DURATION (HOURS)
CORE	0612 351 03A	IT/CU/ICTA/CR/03/4/MA	Computer Network Setup	200
CORE	0714 351 04A	IT/CU/ICTA/CR/04/4/MA	Computer Repair and Maintenance	200
Sub-Total				**400**
Industrial Training				**320**
Total Hours				**720**

COMPUTER NETWORK SETUP

UNIT CODE: 0612 351 03A

TVET CDACC UNIT CODE: IT/CU/ICTA/CR/03/4/MA

Duration of unit: 200 hours

Relationship to Occupational Standards

This unit addresses the unit of competency: Setup Computer Network

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.

Summary of Learning Outcomes

Learning Outcomes	Duration (Hours)
1. Terminate Computer network cables	70
2. Connect Computer network cables	70
3. Perform Computer network Maintenance	60
Total Hours	**200**

Learning outcomes, Content and Suggested Assessment Methods

Learning outcome	Content	Suggested Assessment Methods
1. Terminate Computer network cables	1.1 Selecting Network devices 1.1.1 Introduction to computer networks 1.1.2 Types of network topologies	• Practical • Oral questions • Written tests

	1.1.3 Types of network devices 1.1.4 Components of a computer networks 1.1.5 Types of network tools 1.1.6 Cable colour coding 1.2 Network cable trunking 1.2.1 Definition cable trunking 1.2.2 Types of cable trunking 1.2.3 Tools used in cabling trunking 1.2.3.1 Measuring tape 1.2.3.2 Pencil 1.2.3.3 Cable ties 1.2.3.4 Wire cutters 1.2.3.5 Safety equipment 1.2.3.6 Spirit level 1.2.3.7 Drill 1.2.3.8 Screwdriver 1.3 Network cable termination 1.3.1 Definition of networking cable termination 1.3.2 Tools for cable termination 1.3.2.1 RJ45 connectors 1.3.2.2 Crimping tool 1.3.2.3 Wire stripper 1.3.2.4 Cable cutter 1.3.2 Process of cable termination 1.3.2.1 Cable stripping 1.3.2.2 Colour coding 1.3.2.3 Cable crimping	• Observation • Portfolio of evidence
2. Connect Computer	2.1 Observing safety measures in networking	• Practical • Oral questions

network cables	2.1.1 Computer network safety measures 2.1.1.1 Overall/apron/dust coat 2.1.1.2 Gloves 2.1.1.3 Safety boots 2.1.1.4 Ergonomics 2.1.1.5 First AID kit 2.2 Setup network devices 2.4.1 Router 2.4.2 Switch 2.4.3 Bridge 2.4.4 Hub 2.4.5 Patch panels 2.4.6 Access point 2.3 Network cable testing 2.3.1 Cable testing methods 2.3.2 Continuity Testing 2.3.3 Wire Mapping 2.3.4 Cable Length Testing 2.3.5 Fault Detection 2.3.6 Cable testing tools 2.3.6.1 Cable tester 2.3.6.2 Multimeter 2.3.6.3 Crimping tool 2.3.6.4 Wire Stripper and cutter 2.4 Network cable connection 2.4.1 Networking standards 2.4.1.1 HTTP 2.4.1.2 IEEE 802.1 2.4.1.3 TCP/IP 2.5 Network connection establishment	• Written tests • Observation • Portfolio of evidence

	2.6 Network testing	
3. Perform Computer Network Maintenance	3.1 Monitoring computer network 3.1.1 Introduction to computer network monitoring and maintenance 3.1.2 Computer network monitoring physical tools 3.1.2.1 Cable testers 3.1.2.2 Crimping tool 3.1.2.3 Stripping tool 3.1.3 Physical networking device status monitoring 3.1.3.1 Port and interface 3.1.3.2 Cable and connection 3.1.3.3 Power supply 3.1.3.4 Network optimization 3.2 Troubleshooting Computer network 3.3 Optimizing Computer network 3.3.1 Upgrading network hardware devices 3.3.2 Upgrading computer network cables	• Practical • Oral questions • Written tests • Observation • Portfolio of evidence

Suggested Delivery Methods

- In Instructor led facilitation of theory
- Demonstration by trainer
- Practical work by trainee
- Viewing of related videos

- Group discussions
- Simulation

Recommended resources for 25 trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Trainee: Item)
A	Learning Materials			
1.	Textbooks		13 pcs	13:1
2.	Installation manuals		5pcs	5:1
3.	Charts			
4.	PowerPoint presentations	For trainer's use		
B	Learning Facilities & infrastructure			
5.	Lecture/theory room		1	25:1
6.	Computer Laboratory		1	25:1
7.	Internet Connection			
C	Consumable materials			
8.	Printing papers		1 ream	1:20
9.	Toners		2 pcs	13:1
10.	Assorted colour of whiteboard markers			
D	Tools and Equipment			
1.	Computers		25 pcs	1:1
2.	Projector		1 pc	25:1
3.	Signal testers		5 pcs	5:1
4.	Header checker		25 pcs	1:1
5.	Crimping tools		25 pcs	1:1
6.	Cable tester		5 pcs	5:1

7.	Switches		5pcs	5:1
8.	Repeaters		5pcs	5:1
9.	Routers/modem		5pcs	5:1
10.	Network tool kit		25 pcs	1:1
11.	RJ45		300 pcs	1:10
12.	UTP Ethernet Cable		300 metres	1:10
13.	Antistatic gloves		25 pairs	1:1

COMPUTER REPAIR AND MAINTENANCE

ISCED UNIT CODE: 0714 351 04A

TVET CDACC UNIT CODE: IT/CU/ICTA/CR/04/4/MA

Duration of Unit: 200 Hours

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Perform Computer Repair and Maintenance

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.

Summary of Learning Outcomes

Learning Outcomes	Durations (Hours)
1. Perform computer troubleshooting	50
2. Repair faulty components.	60
3. Test computer component functionality	60
4. Perform computer maintenance	30
Total Hours	**200**

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Perform computer troubleshooting	1.1. User data assessment 1.1.1. Introduction to computer repair and maintenance 1.1.2. Documenting faulty computer user data	• Practical assessment • Project • Observation Checklist

	1.2. Computer problems identification 1.2.1. Computer troubleshooting approaches 1.2.2. Basic computer hardware faults 1.2.3. Methods of information gathering 1.2.4. User data analysis 1.3. Determining solution to the problem 1.3.1. Computer hardware faults remedies 1.3.2. Test hypothesis 1.3.3. Problem Identification 1.3.4. Documentation of solution	• Product Checklist • Written assessment • Portfolio of evidence
2. Repair faulty components.	2.1 Selection of computer components for replacement 2.1.1 Computer hardware components 2.1.1.1 Factors to consider in selecting computer components 2.1.1.2 computer hardware components parts acquisition 2.2 Assembly of tools for repairing or replacing 2.2.1 Computer repair and maintenance tools 2.2.1.1 Straight-head screwdriver, large and small 2.2.1.2 Phillips-head screwdriver, large and small 2.2.1.3 Tweezers or part retriever 2.2.1.4 Needle-nosed pliers 2.2.1.5 Wire cutters 2.2.1.6 Chip extractor 2.2.1.7 Hex wrench set	• Practical assessment • Project • Observation Checklist • Product Checklist • Written assessment • Portfolio of evidence

	2.2.1.8 Torx screwdriver 2.3 Observation of Safety procedures 2.3.1 Safety measures and procedures 2.3.1.1 Personal Protective Equipment's 2.3.1.2 Proper use of tools and equipment 2.3.1.3 Fire safety 2.3.1.4 Classes of fires 2.3.1.5 Fire extinguishers 2.3.1.6 Emergency procedures 2.3.1.7 First AID kit 2.3.1.8 Emergency contact 2.3.1.9 Contingency measures 2.4 Repair and replacing computer components 2.4.1 Computer components Instruction manuals 2.4.2 Computer components disassembly process 2.4.3 Reassembling repaired or replaced computer components 2.5 Disposing faulty or obsolete computer hardware components 2.5.1 Pollution 2.5.2 E- waste 2.5.3 Hazards 2.5.4 Types of E-waste 2.5.5 Proper disposal methods	
3. Test computer component functionality	3.1 Performing POST on computer 3.2 Performing computer component test 3.2.1 Importance of testing 3.2.2 Testing techniques 3.2.2.1 Testing of repaired or replaced	• Practical assessment • Project • Observation Checklist

	components 3.2.3 Evaluation of test Results 3.3 Computer component's functionality report 3.3.1 Generation of test results report	• Product Checklist • Written assessment • Portfolio of evidence
4. Perform computer maintenance	4.1 Computer maintenance scheduling 4.1.1 Introduction to computer maintenance 4.1.1.1 Definition of computer maintenance 4.1.1.2 Importance of computer maintenance 4.1.2 Types of computer maintenance 4.1.3 Prepare computer maintenance schedule 4.2 Performing computer maintenance 4.2.1 Computer maintenance utilities 4.2.2 Uses of computer maintenance utilities 4.2.3 Perform computer maintenance 4.3 Computer maintenance report 4.3.1 Importance of computer maintenance report 4.3.2 Components of computer maintenance report	• Practical assessment • Project • Observation Checklist • Product Checklist • Written assessment • Portfolio of evidence

Suggested Delivery Methods

- Instructor led facilitation using active learning strategies
- Demonstration by trainer
- Practical work by trainee
- Viewing of related videos

- Group discussions
- Direct instructions

Recommended Resources for 25 Trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Trainee: Item)
A	Learning Materials			
1.	Textbooks		5 pcs	5:1
2.	Installation manuals		5 pcs	5:1
3.	Flip Charts		5 pcs	5:1
4.	PowerPoint presentations	For trainer's use		
5.	Magazines/brochures/business cards			
B	Learning Facilities & infrastructure			
6.	Lecture/theory room		1	25:1
7.	Computer Laboratory		1	25:1
C	Consumable materials			
8.	Printing papers		1 ream	1:20
9.	Foolscaps		1 ream	
10.	Toners		2 pcs	13:1
11.	Assorted colour of whiteboard markers			
D	Tools and Equipment			
12.	Computers		25 pcs	1:1

13.	Projector		1 pcs	25:1
14.	Printers		2 pcs	13:1
15.	Whiteboard		1 pcs	25:1
16.	Flash drives		5 pcs	5:1
17.	1 External Hard drive		1 pcs	25:1
18.	Computer Repair Tool box		5	5:1

MODULE 3

UNIT CATEGORY	ISCED UNIT CODE	TVET CDACC UNIT CODE	UNIT NAME	DURATION (HOURS)
COMMON	0714 441 04A	IT/CU/ICTA/CC/01/5/MA	Basic Electronics	100
CORE	0619 451 06A	IT/CU/ICTA/CR/01/5/MA	Computer Software	160
BASIC	0417 441 02A	IT/CU/ICTA/BC/01/5/MA	Work Ethics and Practice	40
CORE	0612 451 07A	IT/CU/ICTA/CR/02/5/MA	Perform Network Design and Management	160
Total Hours				**460**

BASIC ELECTRONICS

ISCED UNIT CODE: 0714 441 04A

TVET CDACC UNIT CODE: IT/CU/ICTA/CC/01/5/MA

Duration of Unit: 100 Hours

Relationship to Occupational Standards

This unit addresses the unit of competency: Apply Basic Electronics

Unit description

This unit specifies the competencies required to apply basic electronic. It involves the ability to: identify electric circuits, identify electronic components, apply semi-conductor theory, classify computer memory, apply logic gates, applying logic gates and perform Boolean algebra operations.

Summary of Learning Outcomes

Learning Outcomes	Duration (hours)
1. Identify electric circuits	10
2. Identify electronic components	10
3. Apply semi-conductor theory	20
4. Classify computer memory	10
5. Apply logic gates	30
6. Perform Boolean algebra operations	20
Total Hours	**100**

Learning Outcomes, Content, and Suggested Assessment Methods

Learning outcomes	Content	Suggested Assessment Methods

1. Identify electrical circuits	1.1 Electrical circuit identification 1.1.1 Definition of electrical circuit 1.1.2 Components of electrical circuit 1.2 Electrical quantities and their S.I units' identification 1.2.1 Basic electrical quantities and their units 1.2.1.1 **Emf** in volts 1.2.1.2 Current in Amperes 1.2.1.3 Power in watts 1.2.1.4 Energy in joules 1.2.1.5 Resistance in ohms 1.3 Types of electrical circuits 1.3.1 AC – Alternating Current 1.3.2 DC – Direct Current	• Practical Activities • Project work • Demonstration • Group discussions • Observation • Third Party report • Portfolio of Evidence • Written tests
2. Identify Electronic components	2.1 Identification of electronic components 2.1.1 Resistor 2.1.2 Capacitor 2.1.3 Diode 2.1.4 Inductor 2.2 Characteristic of electronic components. 2.3 Application of electronic components. 2.4 Characteristics of integrated circuit	• Practical Activities • Project work • Demonstration • Group discussions • Observation • Third Party report • Portfolio of Evidence • Written tests
3. Apply semi-conductor theory	3.1 Explanation of semiconductor theory 3.2 Descriptions of structure of matter 3.3 Explanation of Electrons in conductors and semiconductors 3.4 Types of semiconductor materials	• Practical Activities • Project work • Demonstration • Group

	3.4.1 Silicon 3.4.2 germanium 3.5 Explanation of P-type and N-type materials 3.6 Description of P-N junction diodes 3.6.1 Forward biasing 3.6.2 Reverse biasing 3.7 Types and operations of transistors 3.7.1 PNP type 3.7.2 NPN type 3.8 Application of Semiconductor theory	discussions • Observation • Third Party report • Portfolio of Evidence • Written tests
4. Classify computer memory	4.1 Identification of computer memories 4.1.1 Definition of computer memory 4.1.2 Classification of computer memory 4.1.2.1 Primary memory 4.1.2.2 Secondary memory 4.1.3 Types of computer memories 4.1.3.1 RAM 4.1.3.2 ROM 4.1.3.3 DAM 4.2 Identification of Memory hierarchy speed 4.2.1 Registers 4.2.2 Cache memory 4.2.3 Main memory 4.2.4 Secondary storage 4.2.5 Tertiary storage 4.3 Identification of memory storage levels 4.3.1 Internal 4.3.2 Main 4.3.3 Online 4.3.4 Offline bulk 4.4 Classify computer memories as per the	• Practical Activities • Project work • Demonstration • Group discussions • Observation • Third Party report • Portfolio of Evidence • Written tests

	technology used 4.4.1 Semiconductor memory 4.4.2 Magnetic memory 4.4.3 Optical memory	
5 Apply logic gates	5.1 Identification of Logic gates 5.1.1 Definition of terms 5.1.2 Types of logic gates 5.1.2.1 AND Gate 5.1.2.2 OR Gate 5.1.2.3 NOT Gate 5.1.2.4 NAND Gate 5.1.2.5 NOR Gate 5.1.2.6 XOR Gate 5.1.2.7 XNOR Gate 5.2 Development of Logic circuits 5.3 Simplification of Logic circuits 5.3.1 Logic circuits Simplification Methods 5.3.1.1 Boolean Algebra 5.3.1.2 K-Maps 5.3.1.3 Quine-McCluskey Algorithm 5.3.1.4 Software and CAD Tools 5.4 Application of logic gates in electronic circuits	• Practical Activities • Project work • Demonstration • Group discussions • Observation • Third Party report • Portfolio of Evidence • Written tests
6 Perform Boolean algebra operations	6.1 Key concepts in Boolean algebra 6.1.1 Boolean variables 6.1.2 Logical operations 6.1.3 Boolean expressions 6.1.4 Laws and rules of Boolean algebra 6.1.5 Truth tables 6.1.6 De Morgan's theorem 6.2 Demonstration of Boolean expressions as per the SOPs	• Practical Activities • Project work • Demonstration • Group discussions • Observation • Third Party report • Portfolio of

	6.3 Performance of Basic Boolean operations 6.4 Methods of simplifying Boolean expressions 6.5 Illustration of Boolean Laws and Theorems 6.6 Simplification rules for Boolean expressions	Evidence • Written tests

Suggested Delivery Methods

- Instructor led facilitation using active learning strategies
- Demonstration by trainer
- Practical work by trainee
- Viewing of related videos
- Group discussions
- Direct instructions

Recommended Resources for 25 Trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Trainee: Item)
A	Learning Materials			
1.	Textbooks		5 pcs	5:1
2.	Installation manuals		5 pcs	5:1
3.	Flip Charts		5 pcs	5:1
4.	PowerPoint presentations	For trainer's use		
5.	Magazines/brochures/business cards			
B	Learning Facilities & infrastructure			
6.	Lecture/theory room		1	25:1

7.	Laboratory		1	25:1
C	Consumable materials			
8.	Printing papers		1 ream	1:20
9.	Foolscaps		1 ream	
10.	Toners		2 pcs	13:1
11.	Assorted colour of whiteboard markers			
D	Tools and Equipment			
12.	Computers		25 pcs	1:1
13.	Projector		1 pcs	25:1
14.	Printers		2 pcs	13:1
15.	Whiteboard		1 pcs	25:1
16.	Ohmmeter		5	5:1
17.	Ammeter		5	5:1
18.	Digital Multi meter		5	5:1
19.	Power supplies		5	5:1
20.	Circuits		5	5:1
21.	Semiconductor materials		10	3:1
22.	Conductors e.g., copper, gold, silver		25	1:1
23.	Insulators		5	5:1

24.	Screw Drivers		5	5:1
25.	Resistors		5	5:1
26.	Capacitors		5	5:1
27.	Logic gates		5	5:1
28.	Inductors		5	5:1
29.	Transistors		5	5:1
30.	Transformers batteries, power supplies		5	5:1
31.	Conducting wires		5	5:1

COMPUTER SOFTWARE

ISCED UNIT CODE: 0619 451 06A

TVET CDACC UNIT CODE: IT/CU/ICTA/CR/01/5/MA

Duration of Unit: 160 hours

Relationship to Occupational Standards

This unit addresses the unit of competency: Install Computer Software

Unit Description:

This unit covers the competencies required to install computer software. It involves the ability to: install computer software, test computer software functionality and perform software maintenance.

Summary of Learning Outcomes

LEARNING OUTCOMES	DURATION (HOURS)
1. Install computer software	70
2. Test computer software functionality	40
3. Perform computer software maintenance	50
TOTAL:	**160**

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Install computer Software	1.1 Identification of computer software 1.1.1 Introduction to computer software 1.1.1.2 Definition of computer software 1.1.1.3 Classification of computer software 1.1.1.4 Types of computer software	• Practical assessment • Project • Observation Checklist

	1.1.2 Collecting computer software user needs. 1.2 Selection of computer software 1.2.1 Factors to consider in computer software selection 1.2.2 Acquisition methods of computer software 1.3 Manage local user accounts 1.3.1 Introduction to local user accounts 1.3.2 Types of local user accounts 1.3.2.1 Standard user account 1.3.2.2 Administrator account 1.3.2.3 Guest account 1.3.3 Creating user accounts 1.3.4 Configuration of local user accounts 1.4 Performing data backup 1.1.1 Importance of computer software backup 1.1.2 Types of computer software backup 1.1.3 Back up creation 1.5 Installation of computer Software 1.5.1 Computer software installation media 1.5.2 Computer software installation methods 1.5.3 Types of software registration 1.5.4 Installing computer software 1.5.5 Anti-malware software installation 1.5.5.1 Identify Antimalware to install 1.5.5.2 Identify Antimalware acquisition method 1.5.5.3 Install Antimalware 1.5.5.4 Configure Antimalware	• Product Checklist • Written assessment • Portfolio of evidence

	1.6 Computer software configuration 1.6.1 Importance of software configuration 1.6.2 Computer software configuration tools	
2. Test computer software functionality .	2.1 Software testing 2.1.1 Importance of software testing 2.1.2 Computer software testing techniques 2.1.3 Computer software testing tools 2.1.3.1 Test Complete 2.1.3.2 Selenium 2.1.3.3 Appium 2.1.3.4 Postman 2.1.4 Performing computer software testing 2.2 Corrective measures 2.2.1 Types of corrective measures 2.2.2 Software corrective tools 2.2.3 Performing corrective measures 2.3 Testing of computer software functionality	• Practical assessment • Project • Observation Checklist • Product Checklist • Written assessment • Portfolio of evidence
3. Perform computer software maintenance.	3.1 Development of Software maintenance schedule 3.1.1 Introduction to computer software maintenance 3.1.1.1 Importance software maintenance 3.1.2 Prepare software maintenance schedule 3.1.3 Types of software maintenance 3.1.3.1 Adaptive 3.1.3.2 Perfective 3.1.3.3 Preventive 3.1.3.4 Corrective 3.1.4 Computer software updates 3.1.4.1 Service packs 3.1.4.2 Version upgrades	• Practical assessment • Project • Observation Checklist • Product Checklist • Written assessment • Portfolio of evidence

	3.1.4.3 Security upgrades 3.1.4.4 Device drivers 3.1.4.5 Utility program updates 3.2 Software functionality monitoring 3.2.1 Software functionality monitoring tools 3.2.2 Operating System event logs 3.2.2.1 Types of event logs 3.2.2.1.1 Error event logs 3.2.2.1.2 Warning event logs 3.2.2.1.3 Information event logs 3.2.2.1.4 Success Audit event logs 3.2.2.1.5 Failure Audit event logs 3.3 Conducting software upgrade 3.3.1 Importance of software upgrade 3.3.2 Types of software upgrade 3.3.3 Conducting software upgrade 3.4 Conducting software update 3.4.1 Importance of software update 3.4.2 Types of software update 3.4.3 Conducting software update 3.5 Observing Safety procedures 3.5.1 Safety measures and procedures 3.5.1.1 Overall/apron/dust coat 3.5.1.2 Antiglare screens 3.5.1.3 Gloves 3.5.2 Personal Protective Equipment's 3.5.2.1 Proper use of tools and equipment	

Suggested Delivery Methods

- Instructor led facilitation using active learning strategies

- Demonstration by trainer
- Practical work by trainee
- Viewing of related videos
- Group discussions
- Direct instructions

Recommended Resources for 25 Trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Trainee: Item)
A	Learning Materials			
21.	Textbooks		5 pcs	5:1
22.	Installation manuals		5 pcs	5:1
23.	Flip Charts		5 pcs	5:1
24.	PowerPoint presentations	For trainer's use		
25.	Installation CDs/DVDs		25pcs	1:1
B	Learning Facilities & infrastructure			
26.	Lecture/theory room		1	25:1
27.	Computer Laboratory		1	25:1
C	Consumable materials			
28.	Printing papers		1 ream	1:20
29.	Foolscaps		1 ream	1:20
30.	Toners		2 pcs	13:1

31.	Assorted colour of whiteboard markers			
D	Tools and Equipment			
32.	Computers		25 pcs	1:1
33.	Projector		1 pcs	25:1
34.	Printers		2 pcs	13:1
35.	Whiteboard		1 pcs	25:1
36.	Flash drives		5 pcs	5:1
37.	External Hard drive		5 pcs	5:1
38.	System Software suite		5 pcs	5:1
39.	Application Software suite		5 pcs	5:1

WORK ETHICS AND PRACTICES

ISCED UNIT CODE: 0417 441 02A

TVET CDACC UNIT CODE: IT/CU/ICTA/BC/01/5/MA

Duration of Unit: 40 hours

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Apply work ethics and practices.

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.

Summary of Learning Outcomes

LEARNING OUTCOMES	DURATION (HOURS)
1. Apply self-management skills	**10**
2. Promote ethical practices and values	**10**
3. Promote teamwork	**5**
4. Maintain professional and personal development	**5**
5. Apply problem-solving skills	**5**
6. Promote customer care.	**5**
TOTAL:	**40**

Learning Outcomes, Content, and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Apply self-management skills	1.1 Self-awareness 1.2 Formulating personal vision, mission, and goals 1.3 Healthy lifestyle practices 1.4 Strategies for overcoming work challenge 1.5 Emotional intelligence 1.6 Coping with Work Stress. 1.7 Assertiveness versus aggressiveness and passiveness 1.8 Developing and maintaining high self-esteem 1.9 Developing and maintaining positive self-image 1.10 Time management 1.11 Setting performance targets 1.12 Monitoring and evaluating performance targets	• Observation • Written assessment • Oral assessment • Third party reports • Portfolio of evidence • Project • Practical
2. Promote ethical work practices and values	2.1 Integrity 2.2 Core Values, ethics and beliefs 2.3 Patriotism 2.4 Professionalism 2.5 Organizational codes of conduct 2.6 Industry policies and procedures	• Observation • Written assessment • Oral assessment • Third party reports • Portfolio of evidence • Project • Practical
3. Promote Teamwork	3.1 Types of teams 3.2 Team building 3.3 Individual responsibilities in a	• Observation • Written assessment • Oral assessment

Learning Outcome	Content	Suggested Assessment Methods
	team 3.4 Determination of team roles and objectives 3.5 Team parameters and relationships 3.6 Benefits of teamwork 3.7 Qualities of a team player 3.8 Leading a team 3.9 Team performance and evaluation 3.10 Conflicts and conflict resolution 3.11 Gender and diversity mainstreaming 3.12 Developing Healthy workplace relationships 3.13 Adaptability and flexibility 3.14 Coaching and mentoring skills	• Third party reports • Portfolio of evidence • Project • Practical
4. Maintain professional and personal development	4.1 Personal vs professional development and growth 4.2 Avenues for professional growth 4.3 Recognizing career advancement 4.4 Training and career opportunities 4.5 Assessing training needs	• Observation • Written assessment • Oral assessment • Third party reports • Portfolio of evidence • Project • Practical

Learning Outcome	Content	Suggested Assessment Methods
	4.6 Mobilizing training resources 4.7 Licenses and certifications for professional growth and development 4.8 Pursuing personal and organizational goals 4.9 Managing work priorities and commitments 4.10 Dynamism and on-the-job learning	
5. Apply Problem-solving skills	5.1 Causes of problems 5.2 Methods of solving problems 5.3 Problem-solving process 5.4 Decision making 5.5 Creative thinking and critical thinking process in development of innovative and practical solutions	• Observation • Written assessment • Oral assessment • Third party reports • Portfolio of evidence • Project • Practical
6. Promote Customer Care	6.1 Identifying customer needs 6.2 Qualities of good customer service 6.3 Customer feedback methods 6.4 Resolving customer concerns 6.5 Customer outreach programs 6.6 Customer retention	• Observation • Written assessment • Oral assessment • Third party reports • Portfolio of evidence • Project • Practical

Suggested Methods of Instruction

- Instructor lead facilitation of theory using active learning strategies.
- Demonstrations
- Simulation/Role play
- Group Discussion
- Presentations
- Projects
- Case studies
- Assignments

Recommended Resources for 25 Trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Trainee: Item)
A	Learning Materials			
1.	Textbooks		5 pcs	5:1
2.	PowerPoint presentations	For trainer's use		
3.	Assorted colour of whiteboard markers	For trainer's use	2 packets	
4.	e-Didactics	For trainer's use		
5.	Flashcards			
6.	Flip charts			
7.	Whiteboard			
B	Learning Facilities & infrastructure			
8.	Lecture/theory room		1	25:1

C	Consumable materials			
9.	Printing Papers		1 ream	1:20
10.	Toners		2 pcs	13:1
11.	Internet connection			
D	Tools and Equipment			
12.	Projectors		1	25:1
13.	Printers		4	6:1
14.	Computers/Mobile Phones		25 pcs	1:1

NETWORK DESIGN AND MANAGEMENT

ISCDE UNIT CODE: 0612 441 07A

TVET CDACC UNIT CODE: IT/CU/ICTA/CR/02/5/MA

Duration of Unit: 200 Hours

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Perform Computer Networking

Unit Description

This unit covers the competencies required to perform network design and management**.** It involves the ability to: design computer network, install computer network, test computer network and perform computer network maintenance.

Summary of Learning Outcomes

LEARNING OUTCOMES	DURATION (HOURS)
1. Design computer network	40
2. Install computer network	60
3. Test computer network	30
4. Perform computer network maintenance.	30
TOTAL	**160**

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Design computer network	1.1 User needs collections 1.1.1 Introduction to computer networking 1.1.1.1 Definition of Computer Network	• Practical assessment • Project

	terms 1.1.2 Computer Network types 1.1.2.1 LAN 1.1.2.2 WAN 1.1.2.3 PAN 1.1.2.4 MAN 1.1.3 Network topologies 1.1.3.1 Star 1.1.3.2 Ring 1.1.3.3 Mesh 1.1.3.4 Hybrid 1.1.3.5 Point to Point 1.1.4 Components of a computer network 1.1.4.1 switches/hubs 1.1.4.2 routers 1.1.4.3 ports 1.1.4.4 computers 1.1.4.5 Transmission media 1.1.5 Computer Network user requirements/needs 1.1.5.1 User requirements identification 1.1.5.2 User requirements analysis 1.1.5.3 User requirements documentation 1.2 Physical network design development 1.3 Logical network design development 1.4 Computer network design 1.4.1 Network design overview 1.4.2 Network design methodology 1.4.2.1 Hierarchical Network Design 1.4.2.2 Flat network 1.4.3 Types of computer network sites (Green field and brownfield) 1.4.4 Network site preparation 1.4.4.1 Network floor plan design	• Observation Checklist • Product Checklist • Written assessment • Portfolio of evidence

	1.4.4.2 Data and Access point 1.4.5 Implement the documented user requirements/needs 1.4.6 Fundamental Design Goals 1.4.6.1 Scalability 1.4.6.2 Availability 1.4.6.3 Security 1.4.6.4 Manageability	
2. Install computer network	2.1 Safety measures 2.1.1 Personal Protective Equipment (PPEs) 2.1.1.1 Overall/apron/dust coat 2.1.1.2 Antiglare screens 2.1.1.3 Dust mask 2.1.1.4 Gloves 2.1.1.5 Antistatic equipment 2.1.1.6 Ergonomics 2.1.1.7 First AID kit 2.1.2 Cable management 2.1.1.8 Proper routing 2.1.1.9 Labelling 2.1.3 Electrical safety 2.1.1.10 Use of insulated tools 2.1.1.11 Electrical equipment power ratings 2.1.4 Fire safety 2.1.1.12 Classes of fires 2.1.1.13 Fire extinguishers 2.1.4 Emergency procedures 2.1.1.14 First AID kit 2.1.1.15 Emergency contact 2.1.1.16 Contingency measures 2.2 Computer network components identification 2.2.1 Considerations of network components identification 2.2.1.1 Switches/routers	● Practical assessment ● Project ● Observation Checklist ● Product Checklist ● Written assessment ● Portfolio of evidence

	2.2.1.2 Transmission media and connectors 2.2.1.3 Access points and wireless technology 2.2.1.4 Networking software and management tools 2.2.1.5 Network security devices 2.2.1.6 Servers and storage 2.2.2 Network Tools and materials assembly 2.2.2.1 Basic network tools 2.2.2.1.1 Cable crimpers 2.2.2.1.2 Cable strippers 2.2.2.1.3 Cutters, Scissors, screw drivers Pliers. 2.2.2.1.4 Cable Tie Tools. 2.2.2.1.5 Fiber Optic Tools. 2.2.2.1.6 Insertion - Extraction Tools. 2.2.2.1.7 Manual/Automatic Switch Boxes. 2.2.2.1.8 Network Testers. 2.2.2.1.9 Punch down Tools. 2.2.2.1.10 Tools usage and safety 2.2.2.1.11 Driver installers 2.2.2.1.12 Multimeter 2.2.2.1.13 Tone generator and probe 2.2.3 Computer Network materials 2.2.3.1 Network cables 2.2.3.2 Cable trunking covers 2.2.3.3 Connectors 2.2.3.4 RJ45 Sockets 2.2.3.5 Patch cords 2.2.3.6 Cable ties 2.3 Computer network set up	

	2.3.1 Network cabling and installation 2.3.1.1 Network design layout 2.3.1.2 Understanding cabling standards and codes 2.3.1.3 Cable termination and installation 2.3.1.4 Setting up wireless network devices 2.3.1.5 Network set up as per the design 2.3.1.6 Application of cable management best practices 2.4 Computer network devices configuration 2.4.1 Network models (TCP/IP, OSI) 2.4.2 Understanding IP Addressing 2.4.2.1 Classful IP Addressing 2.4.2.2 TCP/IP addressing 2.4.2.3 IPV4 and IPV6 2.4.2.4 IP Address Classes 2.4.2.5 Classless interdomain routing (CIDR-Subnetting) 2.4.2.6 Select IP addressing scheme (static vs. dynamic). 2.4.3 Basic switch and router configuration 2.4.3.1 Initial set up and configuration 2.4.3.2 Configuring interfaces and IP addresses 2.4.3.3 Setting up routing protocols (EIGRP, RIP and OSPF) 2.4.3.4 Configuring VLANs 2.4.3.5 Configuring access control lists 2.4.3.6 Implementing network address translation (NAT) and port address translation (PAT) 2.4.3.7 Implementing port security 2.4.3.8 Implementing spanning tree protocol (STP).	

	2.4.3.9 Configuration link aggregation (LACP) 2.4.4 Wireless access point configuration 2.4.4.1 Setting up access points (APs) 2.4.4.2 SSID, DHCP, DNS, SMTP 2.4.4.3 Configuring wireless security 2.4.4.4 Managing wireless network 2.4.4.5 Network Security configuration 2.4.4.6 Definition of Network privileges 2.4.4.7 Implement firewall and security policies 2.4.4.8 Types of Privileged Accounts 2.4.4.9 Network privileges are allocated according to the network configuration. 2.5 Computer network documentation 2.5.1 Define network documentation 2.5.2 Importance of network documentation 2.5.3 Types of network documentations 2.5.3.1 Physical, Logical and configuration 2.6 Computer network components disposal 2.6.1 Identify computer network waste 2.6.2 Classify computer network waste 2.6.2.1 E- waste 2.6.2.2 Hazards 2.6.2.3 Disposal methods 2.6.3 Legal regulation and compliance on waste disposal 2.6.3.1 Waste management act, 2022 2.6.3.2 EMCA act, 2015 on waste management 2.6.4 Disposal methods 2.6.4.1 The public procurement and assets disposal act, 2015	

3. Test computer network	3.1 Introduction to network testing 3.1.1 Importance of network testing 3.1.2 Network testing tools and equipment 2.6.4.2 Clamp meter 2.6.4.3 Voltmeter 2.6.4.4 Cable tester 2.6.4.5 Signal tester 2.6.4.6 Ping 2.6.4.7 Traceroute 2.6.4.8 Wireshark 3.2 Network components testing 3.2.1 Types of network testing 2.6.4.9 Performance 2.6.4.10 Functional 2.6.4.11 Security 3.2.2 Network testing procedures and standards 3.3 Network testing report 3.3.1 Importance of generating network test report 3.3.2 Components of a network test report 3.3.3 Presenting network test reports 2.6.4.12 Reports presentation techniques 2.6.4.13 Preparing interactive presentations	• Practical assessment • Project • Observation Checklist • Product Checklist • Written assessment • Portfolio of evidence
4. Perform computer network maintenance.	4.1 Computer network maintenance schedule 4.1.1 Importance of network maintenance 4.1.2 Preparation of maintenance schedule 4.1.3 Network troubleshooting process 4.1.4 Network troubleshooting techniques 4.2 Computer network Monitoring 4.2.1 Monitoring tools 4.2.1.1 Ping 4.2.1.2 Tracert 4.2.1.3 NSLookup	• Practical assessment • Project • Observation Checklist • Product Checklist • Written assessment • Portfolio of

	4.2.1.4 Ipconfig 4.2.1.5 Speed test 4.2.1.6 Traceroute 4.2.1.7 Wireshark 4.2.2 Setting and configuring monitoring tools 4.2.3 Analysing network performance data 4.3 Computer network optimization 4.3.1 Network optimization techniques 4.3.2 Implementing quality of service (QOS) 4.4 Computer network maintenance report 4.4.1 Importance of generating network maintenance report 4.4.2 Components of a network maintenance report 4.4.3 Preparation of network maintenance report	evidence

Suggested Delivery Methods

- Instructor led facilitation using active learning strategies
- Demonstration by trainer
- Practical work by trainee
- Viewing of related videos
- Group discussions
- Direct instructions

Recommended Resources for 25Trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Trainee: Item)
A	Learning Materials			
11.	Textbooks		5 pcs	5:1

12.	Installation manuals			
13.	Charts			
14.	PowerPoint presentations	For trainer's use		
B	Learning Facilities & infrastructure			
15.	Lecture/theory room		1	25:1
16.	Computer laboratory		1	25:1
C	Consumable materials			
17.	5Printing papers		1 ream	1:20
18.	Toners		2 pcs	13:1
19.	Assorted colour of whiteboard markers			
D	Tools and Equipment			
14.	Computers		25 pcs	1:1
15.	Projector		1 pc	25:1
16.	Signal testers		5 pcs	5:1
17.	Header checker		25 pcs	1:1
18.	Crimping tools		25 pcs	1:1
19.	Cable tester		5 pcs	5:1
20.	Punch Downs		5 pcs	5:1
21.	Switches		5pcs	5:1
22.	Repeaters		5pcs	5:1
23.	Routers/modem		5pcs	5:1
24.	Network tool kit		25 pcs	1:1
25.	Gateways		5pcs	5:1
26.	Packets of RJ45		300 pcs	1:10
27.	Fibre Modules (SFP)		5pcs	5:1
28.	UTP Ethernet Cable		300 metres	1:10
29.	25 Antistatic gloves		25 pairs	1:1

MODULE 4

UNIT CATEGORY	ISCED UNIT CODE	TVET CDACC UNIT CODE	UNIT NAME	DURATION (HOURS)
COMMON	0613 451 05A	IT/CU/ICTA/CC/02/5/MA	Computer Programming Principles	180
CORE	0612 451 08A	IT/CU/ICTA/CR/03/5/MA	Computerized Database System	200
BASIC	0031 441 01A	IT/CU/ICTA/BC/01/5/MA	Communication Skills	40
BASIC	0413 441 03A	IT/CU/ICTA/BC/02/5/MA	Entrepreneurial Skills	40
Sub-Total Hours				**460**
Industrial Training				**480**

COMPUTER PROGRAMMING PRINCIPLES

ISCED UNIT CODE: 0613 451 05A

TVET CDACC UNIT CODE: IT/CU/ICTA/CC/02/5/MA

Duration of Unit: 180 Hours

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Apply Computer Programming Principles

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.

Summary of Learning Outcomes

LEARNING OUTCOMES	DURATION (HOURS)
1. Apply Computer programming skills	50
2. Demonstrate Structured programming skills	60
3. Demonstrate Object-oriented programming skills	70
TOTAL	**180**

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Apply computer programming skills	1.1 Identification of Programming Languages 1.1.1 Overview of programming language categories (e.g., procedural, object-oriented, functional)	• Practical Activities • Project work • Demonstration • Group discussions • Observation

	1.1.2 Criteria for selecting languages based on user requirements 1.2 Application Programming Paradigms 1.2.1.1 Explanation of common programming paradigms 1.2.1.2 Functional 1.2.1.3 Procedural 1.2.1.4 Object-oriented 1.2.1.5 Imperative 1.2.1.6 Declarative 1.2.2 Choosing the appropriate paradigm based on project needs 1.3 Program Development Life Cycle 1.3.1 Stages of the program development life cycle 1.3.2 Best practices for adapting the life cycle to work requirements 1.4 Application of Program Design Tools 1.4.1 Overview of design tools 1.4.1.1 Flow charts 1.4.1.2 Decision tables 1.4.1.3 Decision trees 1.4.1.4 Pseudocode 1.4.1.5 Algorithm 1.4.2 Selecting design tools based on user requirements and project complexity 1.5 Identification of Program Writing Tools 1.5.1 Common program writing tools and IDEs 1.5.1.1 Text editors 1.5.1.2 Compilers Linkers 1.5.1.3 Debuggers	• Portfolio of Evidence • Written tests

	1.5.1.4 Special Integrated Development Environment (IDE) 1.5.1 Evaluating tools based on system requirements and developer preferences	
2. Demonstrate structured programming skills	2.1 Declaration of Identifiers in C language 2.1.1 Guidelines for naming conventions and best practices 2.1.2 Ensuring identifiers align with program design specifications 2.2 Initializing Variables and Constants in C language 2.2.1 Importance of proper initialization in programming 2.2.2 Techniques for initialization based on design specifications 2.3 Applying User-Defined Data Types in C language 2.3.1 Overview of user-defined data types in C language 2.3.1.1 Structures 2.3.1.2 Classes 2.3.1.3 Arrays 2.3.1.4 Function 2.3.2 Criteria for selecting data types based on system requirements 2.4 Creating Computer program input in C language 2.5 Application of Data control structures in C program 2.5.1 Types of control structures 2.5.1.1 Selection	• Practical Activities • Project work • Demonstration • Group discussions • Observation • Third Party report • Portfolio of Evidence • Written tests

	2.5.1.2 Loops 2.5.1.3 Sequence 2.5.2 Best practices for implementing control structures as per design requirements 2.6 Data structures in C program 2.6.1 Overview of common data structures. 2.6.1.1 Arrays 2.6.1.2 Queue 2.6.1.3 Stack 2.6.1.4 Linked lists 2.6.2 Selecting appropriate data structures based on design specifications. 2.7 Creating C computer program subroutines 2.7.1 Benefits of using subroutines 2.7.2 Designing subroutines to meet user needs 2.7.3 Functions and subprograms 2.8 Coding of C Computer program output 2.9 Performing C Computer Program Debugging 2.9.1 Common debugging techniques and tools 2.9.2 Following work procedures for systematic debugging 2.10 Compiling C Computer Program 2.10.1 Steps involved in the compilation process 2.10.2 Ensuring compliance with system requirements during compilation	

3. Demonstrate object-oriented programming skills	3.1 Implementing Objects and Classes in C++ language 3.1.1 Overview of objects and classes in OOP 3.1.2 Ensuring implementation aligns with work procedures 3.2 Declaring Object Methods in C++ language 3.2.1 Defining methods that fulfill application requirements 3.2.2 Best practices for method naming and functionality 3.3 Applying Namespaces in C++ language 3.3.1 Understanding the role of namespaces in OOP 3.3.2 Implementing namespaces 3.4 Data abstraction concepts in C++ language 3.4.1 Definition of data abstraction 3.4.2 Importance of data abstraction 3.4.3 Implementing of data abstraction in OOP 3.5 Object encapsulations in C++ language 3.5.1 Definition of Object encapsulations 3.5.2 Importance of Object encapsulations 3.5.3 Implementing of Object encapsulations in OOP 3.6 Class templates implementation 3.7 Class inheritance implementation 3.7.1 Definition of data abstraction 3.7.2 Importance of data abstraction 3.7.3 Base class 3.7.4 Derived class	• Practical Activities • Project work • Demonstration • Group discussions • Observation • Third Party report • Portfolio of Evidence • Written tests

	3.7.5 Inheritance relationships 3.7.6 Types of inheritance 3.8 Implementing class polymorphism in C++ language 3.8.1 Definition of data polymorphism 3.8.2 Importance of data polymorphism 3.8.3 Implementing of data polymorphism in OOP	

Suggested Delivery Methods

- Instructor led facilitation using active learning strategies
- Demonstration by trainer
- Practical work by trainee
- Viewing of related videos
- Group discussions
- Direct instructions

Recommended Resources for 25 Trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Trainee: Item)
A	Learning Materials			
1.	Textbooks		5 pcs	1:5
2.	Installation manuals			
3.	Charts			
4.	PowerPoint presentations	For trainer's use		
5.	Assorted colour of whiteboard markers	For trainer's use		

6.	e-Didactics	For trainer's use		
B	Learning Facilities & infrastructure			
7.	Lecture/theory room		1	1:25
8.	Computer Laboratory		1	1:25
C	Consumable materials			
9.	Printing Papers		1 ream	1:20
10.	Toners		2 pcs	13: 1
11.	Internet connection			
D	Tools and Equipment			
12.	Projectors		1	25:1
13.	Printers		4	6:1
14.	Flash drives		5 pcs	5:1
15.	Computers		25 pcs	1:1
16.	Integrated Development Environment (IDEs) – C,C++, Java and Visual Studio, IntelliJ IDEA, Python IDE		25 pcs	1:1

COMPUTERIZED DATABASE SYSTEMS

ISCED UNIT CODE: 0612 451 08A

TVET CDACC UNIT CODE: IT/CU/ICTA/CR/03/5/MA

Duration of Unit: 200 Hours

Relationship to Occupational Standards

This unit addresses the unit of competency: Manage Computerized Database Systems

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.

Summary of Learning Outcomes:

Learning Outcomes	Durations (Hours)
1. Perform website Application user need analysis	**30**
2. Design website application	**50**
3. Develop website application	**50**
4. Host the website application	**30**
5. Test the website application	**20**
6. Maintain the website application	**20**
Total Hours	**200**

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Perform	1.1 Website user requirements	• Practical test

Website User Needs Analysis	identification 1.1.1 Introduction to Web Programming 1.1.1.1 Definition of key web terms. 1.1.1.2 History of the Internet, the Web, CSS & HTML 1.1.1.3 Web programming/scripting languages 1.1.1.4 Current trends 1.1.1. Importance of websites 1.1.2. Types of websites 1.1.3. Website design requirements 1.1.1.5 Types of user requirements 1.1.1.5.1 Functional requirements 1.1.1.5.2 Non-functional requirements 1.1.1.6 User requirements identification 1.1.1.7 User requirements analysis 1.2 Website user requirements documentation 1.2.1 User requirements documentation tools 1.2.2 Preparation of user requirements specifications	• Projects • Learner Portfolio of evidence • Oral questioning • Interviews • Third party report • Written tests • Case study

	document 1.3 Website user requirements specifications review 1.3.1 Importance of user requirement review 1.3.2 User requirement review techniques 1.3.3 User requirements specifications validation and verification 1.4 User requirements review process 1.5 Updating user requirements specifications document	
2. Design Website	2.1 Website application design tools 2.1.1 Introduction website design 2.1.1.1 Website design principles 2.1.1.2 Website Design Process 2.1.1.3 User Experience (UX) design 2.1.2 Introduction website design tools 2.1.2.1 Figma 2.1.2.2 WordPress 2.1.2.3 Canvas 2.1.2.4 Wix 2.1.2.5 Adobe Dreamweaver 2.1.3 Factors to consider when selecting design tools 2.1.4 Installation and configuration design tools	• Practical test • Projects • Learner Portfolio of evidence • Oral questioning • Interviews • Third party report • Written tests • Case study

	2.2 Implementation of website design methods 2.2.1 User-Cantered Design 2.2.2 Visual Design 2.2.2.1 Elements of Visual Design 2.2.3 Interaction Design 2.2.4 Wireframing and Prototyping 2.3 Development of website application visual hierarchy 2.3.1 Graphical user interface 2.3.2 Hierarchy of Elements 2.3.2.1 Typography 2.3.2.2 Color and contrast 2.3.2.3 Spacing and Layout 2.3.2.4 Reading patterns 2.3.2.5 Size and scale 2.3.2.6 Proximity and repetition 2.3.2.7 Alignment 2.3.2.8 Texture and style 2.4 Creation of website application site map 2.4.1 Importance of site maps for web design and SEO 2.4.2 Types of site maps 2.4.3 Creating visual site maps 2.4.4 Creating website wireframes	
3. Develop The Website	1.1 Creation of web pages 1.1.1 HTML Coding 1.1.1.1 Introduction to HTML5	• Practical test • Projects • Learner Portfolio of

	1.1.1.2 HTML Tags 1.1.1.2.1 Structural elements and attributes 1.1.1.2.2 Formatting HTML documents 1.1.1.2.3 Tables 1.1.1.2.4 Linking Web Pages 1.1.1.2.5 Working with Layouts 1.1.1.2.6 Special effects and Animation using HTML5 1.1.1.2.7 Multimedia 1.1.1.2.8 Managing forms 1.1.1.2.9 DOM 1.1.1.2.10 Events 1.1.1.2.11 HTML frameworks (Bootstrap and Tailwind) 1.1.2 Cascading Style Sheets (CSS) 1.1.2.1 Introduction to CSS 1.1.2.2 Various types of styles sheets 1.1.2.3 Inheritance and cascading order 1.1.2.4 Formatting text, fonts, colours and Background 1.1.2.5 Exploring CSS class and ID attributes 1.1.2.6 HTML Tags 1.1.2.7 Block eleven elements 1.1.2.8 Fundamentals of Document	evidence • Oral questioning • Interviews • Third party report • Written tests • Case study

	Object Model (DOM) 1.1.3 Website Scripting 1.1.3.1 Functions of scripting languages 1.1.3.2 Types of scripting languages 1.1.3.3 Java scripting 1.1.3.3.1 Introduction to JavaScript 1.1.3.3.2 Statements Syntax 1.1.3.3.3 Values & Variables 1.1.3.3.4 Operators 1.1.3.3.5 Statements 1.1.3.3.6 Event Handling 1.1.3.3.7 Timing Events 1.1.3.3.8 Functions and objects 1.2 Website Backend Creation 1.2.1 Database Creation 1.2.2 Introduction to MYSQL 1.2.3 File systems and databases 1.2.4 Relational database Models 1.2.5 SQL 1.2.6 Entity Relationship modelling 1.2.7 Normalization of database tables 1.2.8 Database design 1.2.9 Working with Database Schemas 1.2.10 Create-Read-Update-Destroy (CRUD) 1.2.11 Joins 1.2.12 Aggregate Functions and Groups 1.2.13 Sub Queries 1.3 Website application frontend and	

	backend integration 1.3.1 PHP 1.3.1.1 Importance of PHP 1.3.1.2 Fundamentals of PHP Development 1.3.1.3 Various Data Types 1.3.1.4 Advanced PHP Functions 1.3.1.5 Classes 1.3.1.6 Objects 1.3.1.7 Various Database concepts 1.3.1.8 Cookies and Session Management 1.3.1.9 How to work with forms and system file 1.3.1.10 Error Handling 1.3.1.11 Secure PHP Programming 1.3.1.12 Performance Optimization of PHP Applications 1.3.1.13 Model View Controller (MVC) 1.3.2 Jquery: 1.3.2.1 Introduction to JQuery 1.3.2.2 Selectors 1.3.2.3 Jquery – DOM 1.3.2.4 Jquery Events 1.3.2.5 Ajax 1.3.2.6 UI (User Interface)	
2. Host the Website	2.1 Website application hosting platform 2.1.1 Introduction to website hosting 2.1.2 Types of website hosting services 2.1.3 Factors to consider when	• Practical test • Projects • Learner Portfolio of evidence

	selecting a host 2.1.4 Website hosting process 2.2 Server environment setup 2.2.1 Configuring hosting environment (cPanel, Plesk) 2.2.2 Installing web servers (Apache, nginx) 2.2.3 Database set up (MySQL, PostgreSQL) 2.3 Uploading website application files. 2.3.1 Methods of uploading files 2.3.2 Connecting files to the server 2.4 Website server configuration 2.4.1 Importance of website server configuration 2.4.2 Setting up virtual hosts 2.4.3 Configuring directory structures and permissions 2.4.4 Managing server files and directories 2.4.5 Implementing SSL/TLS 2.4.6 Firewall and access control configurations 2.4.7 Backup configuration 2.4.8 Setting server monitoring tools	• Oral questioning • Interviews • Third party report • Written tests • Case study
3. Test The Website	5.1 Website application test plan 3.1.1 Importance of website application testing 3.1.2 Importance of website application test plan 3.1.3 Preparation of website	• Practical test • Projects • Learner Portfolio of evidence • Oral questioning • Interviews

	application test plan 5.2 Website application testing techniques selection 3.2.1 Types of website application testing techniques 3.2.1.1 Functionality Testing 3.2.1.2 Black box 3.2.1.3 Regression 3.2.1.4 unit 3.2.1.5 Usability Testing 3.2.1.6 Interface Testing 3.2.1.7 Compatibility Testing 3.2.1.8 Performance Testing 3.2.1.9 Security Testing 3.2.2 Factors to consider when selecting website application testing techniques 5.3 Website application testing 3.3.1 Website application testing tools 3.3.2 Website application testing standards, procedures and user requirements 3.3.3 Preparation of website application test data 3.3.4 Perform website application testing 5.4 Test report development 3.4.1 Importance of website application test report 3.4.2 Website application test report development tools	• Third party report • Written tests • Case study.

	3.4.3 Preparation of website application test report	
4. Maintain The Website	4.1 Website monitoring 4.1.1 Importance of website maintenance. 4.1.2 Website monitoring tools 4.1.3 Integrate website monitoring tools (Google analytics) 4.1.4 Analysis of website traffic and performance data 4.2 Development of Monitoring report 4.2.1 Importance of Monitoring report 4.2.2 Website monitoring via logging practices 4.2.3 Preparation of Monitoring report 4.3 Fixing website application bugs 4.4 Updating website application 4.4.1 Updating and archiving of website content 4.4.2 Creation of website pages 4.4.3 Website version upgrading 4.4.4 Vulnerability scans and updates 4.5 Backing up Website 4.5.1 Importance of website data back up 4.5.2 Types of website data back up 4.5.3 Website data backup tools	• Practical test • Projects • Learner Portfolio of evidence • Oral questioning • Interviews • Third party report • Written tests • Case study.

Suggested Delivery Methods

- Demonstration by trainer

- Practical work by trainee
- Viewing of related videos
- Group discussions
- Direct instructions
- Instructor led facilitation using active learning strategies

Recommended Resources for 25 Trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Trainee: Item)
A	Learning Materials			
1.	Textbooks		5pcs	5:1
2.	Installation manuals			
3.	Charts			
4.	PowerPoint presentations	For trainer's use		
B	Learning Facilities & infrastructure			
1.	Lecture/theory room		1	25:1
2.	Computer Laboratory		1	25:1
C	Consumable materials			
3.	Printing papers		1 ream	1:20
4.	Toners		2 pcs	13:1
5.	Assorted colour of whiteboard markers			

D	Tools and Equipment			
6.	Computers		25 pcs	1:1
7.	Projector		1pc	25:1
8.	Printers		5 pcs	5:1
9.	Whiteboard		1pc	25:1
10.	flash drives		5 pcs	5:1
11.	External Hard drive		5 pcs	5:1
12.	Microsoft Access		25 pcs	1:1
13.	MYSQL		25 pcs	1:1
14.	Test Data Generator		25 pcs	1:1
15.	WAMP/XAMP		25 pcs	1:1

COMMUNICATION SKILLS

ISCED UNIT CODE: 0031 441 01A

TVET CDACC UNIT CODE: IT/CU/ICTA/BC/01/5/MA

Duration of Unit: 40 hours

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Apply Communication Skills

Unit Description

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

Summary of Learning Outcomes

LEARNING OUTCOMES	DURATION (HOURS)
1. Apply communication channels.	5
2. Apply written communication skills.	10
3. Apply non-verbal skills.	10
4. Apply oral communication skills.	5
5. Apply group communication skills.	10
TOTAL	**40**

Learning Outcomes, Content, and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Apply communication channels	1.1 Communication process 1.1.1 Principles of effective communication 1.2 Channels/medium/modes of	• Oral questions • Written assessment • Observation • Portfolio of Evidence

Learning Outcome	Content	Suggested Assessment Methods
	communication 1.1.1 Factors to consider when selecting a channel of communication 1.1.2 Barriers to effective communication 1.2 Flow/patterns of communication 1.2.1 Sources of information 1.2.2 Organizational policies	• Practical assessment • Third party report
2. Apply written communication skills	2.1 Types of written communication 2.2 Elements of communication 2.3 Organization requirements for written communication	• Oral assessment • Written assessment • Observation • Portfolio of Evidence • Practical assessment • Third party report
3. Apply non-verbal communication skills	3.1 Utilize body language and gestures 3.2 Apply body posture 3.3 Apply workplace dressing code	• Oral assessment • Written assessment • Observation • Portfolio of Evidence • Practical assessment • Third party report
4. Apply oral communication skills	4.1 Types of oral communication pathways 4.2 Effective questioning	• Oral assessment • Written assessment • Observation

Learning Outcome	Content	Suggested Assessment Methods
	techniques 4.3 Workplace etiquette 4.4 Active listening	• Portfolio of Evidence • Practical assessment • Third party report
5. Apply group discussion skills	5.1 Establishing rapport 5.2 Facilitating resolution of issues 5.3 Developing action plans 5.4 Group organization techniques 5.5 Turn-taking techniques 5.6 Conflict resolution techniques 5.7 Team-work	• Oral assessment • Written assessment • Observation • Portfolio of Evidence • Practical assessment

Suggested Methods of Instruction

- Roleplaying
- Simulation
- Field trips
- Viewing of related videos
- Demonstrations
- Online Training
- Group discussions.
- Instructor led facilitation using active learning strategies.

Recommended Resources for 25 trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Trainee: Item)
A	Learning Materials			
1.	Textbooks		5 pcs	5:1

2.	PowerPoint presentations	For trainer's use		
3.	Assorted colour of whiteboard markers	For trainer's use	2 packets	
4.	e-Didactics	For trainer's use		
5.	Flashcards			
6.	Flip charts			
7.	Whiteboard			
B	Learning Facilities & infrastructure			
8.	Lecture/theory room		1	25:1
C	Consumable materials			
9.	Printing Papers		1 ream	1:20
10.	Toners		2 pcs	13:1
11.	Internet			
D	Tools and Equipment			
12.	Projectors		1	25:1
13.	Printers		4	6:1
14.	Computers/Smartphones		25 pcs	1:1

ENTREPRENEURIAL SKILLS

ISCED UNIT CODE: 0413 441 03A

TVET CDACC UNIT CODE: IT/CU/ICTA/BC/02/5/MA

Duration of unit: 70 hours

Relationship to occupational standards

This unit addresses the unit of competency: Apply Entrepreneurial skills.

Unit Description:

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

Summary of Learning Outcomes

LEARNING OUTCOMES	DURATION (HOURS)
1. Apply financial literacy	**5**
2. Apply the entrepreneurial concept	**5**
3. Identify entrepreneurship opportunities	**5**
4. Apply business legal aspects	**10**
5. Innovate Business Strategies	**5**
6. Develop business plan	**10**
TOTAL	**40**

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Apply financial literacy	1. Personal finance management 2. Balancing between needs and wants 3. Budget Preparation 4. Savings management 5. Factors to consider when deciding where to save 6. Debt management 7. Factors to consider before taking a loan 8. Investment decisions 9. Types of investments 10. Factors to consider when investing money 11. Insurance services • Insurance products available in the market • Insurable risks	• Observation • Project • Written assessment • Oral assessment • Third party report • Interviews
2. Apply entrepreneurial concept	2.1 Difference between Entrepreneurs and Business persons 2.2 Types of entrepreneurs 2.3 Ways of becoming an entrepreneur 2.4 Characteristics of Entrepreneurs 2.5 salaried employment and self-employment 2.6 Requirements for entry into self-employment 2.7 Roles of an Entrepreneur in an enterprise 2.8 Contributions of Entrepreneurship	• Observation • Project • Written assessment • Oral assessment • Third party report

Learning Outcome	Content	Suggested Assessment Methods
3. Identify entrepreneurship opportunities	3.1 Sources of business ideas 3.2 Factors to consider when evaluating business opportunity 3.3 Business life cycle	• Observation • Project • Written assessment • Oral assessment • Third party report
4. Apply business legal aspects	4.1 Forms of business ownership 4.2 Business registration and licensing processing 4.3 Types of contracts and agreements 4.4 Employment laws 4.5 Taxation laws	• Observation • Project • Written assessment • Oral assessment • Third party report
5. Innovate business Strategies	5.1 Creativity in business 5.2 Innovative business strategies 5.3 Entrepreneurial Linkages 5.4 ICT in business growth and development	• Observation • Project • Written assessment • Oral assessment • Third party report
6. Develop Business Plan	6.1 Business description 6.2 Marketing plan 6.3 Organizational/Management plan 6.4 Production/operation plan 6.5 Financial plan 6.6 Executive summary 6.7 Business plan presentation 6.8 Business idea incubation	• Observation • Written assessment • Project • Oral assessment • Third party report

Suggested Methods of Instruction

- Direct instruction with active learning strategies
- Project (Business plan)

- Case studies
- Field trips
- Group Discussions
- Demonstration
- Question and answer
- Problem solving
- Experiential
- Team training
- Guest speakers

Recommended Resources for 25 Trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Trainee: Item)
A	Learning Materials			
1.	Textbooks		5 pcs	5:1
2.	Business plan templates		5 pcs	5:1
3.	Business Journals		5 pcs	5:1
4.	Newspapers and Handouts			
5.	PowerPoint presentations	For trainer's use		
6.	Assorted colour of whiteboard markers	For trainer's use	2 packets	
7.	e-Didactics	For trainer's use		
8.	Flashcards			
9.	Flip charts			
10.	Whiteboard			

B	Learning Facilities & infrastructure			
11.	Lecture/theory room		1	25:1
C	Consumable materials			
12.	Printing Papers		1 ream	1:20
13.	Toners		2 pcs	13:1
14.	Internet connection			
D	Tools and Equipment			
15.	Projectors		1	25:1
16.	Printers		4	6:1
17.	Computers/Smartphones		25 pcs	1:1

MODULE 5

UNIT CATEGORY	ISCED UNIT CODE	TVET CDACC UNIT CODE	UNIT NAME	DURATION (HOURS)
COMMON	0541541 01A	IT/CU/ICTA/CC/01/6/MA	Discrete Mathematical Concepts	120
COMMON	0613541 02A	IT/CU/ICTA/CC/02/6/MA	System Analysis and Design	110
CORE	0613551 03A	IT/CU/ICTA/CR/01/6/MA	Develop Website Application	220
	Total Hours			**450**

DISCRETE MATHEMATICAL CONCEPTS

ISCED UNIT CODE: 0541 541 01A

TVET CDACC UNIT CODE: IT/CU/ICTA/CC/01/6/MA

Duration of Unit: 120 Hours

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Apply Discrete Mathematical Concepts

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.

Summary of Learning Outcomes

Learning Outcomes	Duration (Hours)
1. Carry out set theory operations	20
2. Perform matrix operations	20
3. Apply Number Systems	20
4. Apply logic Gates	20
5. Perform sequence and series operations	20
6. Demonstrate graph theory	20
Total Hours	**120**

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods

1. Carry Out Set Theory Operations	1.1 Sets representation 1.1.1 Introduction to set theory operations 1.1.1.1 Definition of key terms 1.1.1.2 Set builder notation 1.1.2 Identification sets properties 1.1.3 Order and Uniqueness 1.1.4 Methods of set representation 1.1.4.1 Roster Form 1.1.4.2 Set Builder Form 1.1.4.3 Finite 1.1.4.4 Infinite 1.1.4.5 Statement form 1.1.4.6 Tabular form 1.2 Set application 1.2.1 Types of sets 1.2.1.1 Finite Set 1.2.1.2 Infinite Set 1.2.1.3 Subset 1.2.1.4 Proper Subset 1.2.1.5 Universal Set 1.2.1.6 Empty or Null 1.2.1.7 Equal 1.2.1.8 Equivalent Set 1.2.1.9 Singleton Set or Unit Set 1.2.1.10 Overlapping Set 1.2.1.11 Disjoint Set 1.3 Set Operations 1.3.1 Cardinality of a set. 1.3.2 Union	• Practical Activities • Project work • Demonstration • Group discussions • Observation • Third Party report • Portfolio of Evidence • Written tests

	1.3.3 Intersection 1.3.4 Difference 1.3.5 Complement 1.3.6 Venn Diagrams	
2. Perform Matrix Operations	2.1 Identification of matrices 2.1.1 Definition of key terms 2.1.1.1 Matrix 2.1.1.2 Dimension 2.1.1.3 Elements 2.1.1.4 Application of matrices 2.1.1.4.1 Computer Graphics 2.1.1.4.2 Robotics 2.1.1.4.3 Machine learning 2.1.2 Types of matrices 2.1.2.1 Row matrix 2.1.2.2 Column matrix 2.1.2.3 Zero matrix 2.1.2.4 Square matrix 2.1.2.5 Diagonal matrix 2.1.2.6 Upper Triangular Matrix 2.1.2.7 Lower Triangular Matrix 2.1.2.8 Scalar matrix 2.1.2.9 Identity matrix 2.1.2.10 Transposed matrix 2.1.2.11 Symmetric matrix 2.1.2.12 Skew-symmetric matrix	• Practical Activities • Project work • Demonstration • Group discussions • Observation • Third Party report • Portfolio of Evidence • Written tests

	2.1.2.13 Orthogonal matrix 2.2 Matrix operations 2.2.1 Sum of matrices 2.2.1.1 2 x 2 matrices 2.2.1.2 3 x 3 matrices 2.2.2 Matrix subtraction 2.2.2.1 2 x 2 matrices 2.2.2.2 3 x 3 matrices 2.2.3 Product of two matrices 2.3 Determinant of a matrix 2.3.1 Determinant of a 2 x 2 matrix 2.3.2 Determinant of a 3 x 3 matrix 2.3.3 Solving simultaneous equations using matrix method 2.3.3.1 Cramer's rule 2.3.3.2 Gaussian elimination method 2.4 Inverse of a matrix 2.4.1 Inverse of a 2 x 2 matrix 2.4.2 Inverse of a 3 x 3 matrix 2.4.3 Transpose 2.4.3.1 Of 2 x 2 matrix 2.4.3.2 Of 3 x 3 matrix 2.4.4 Co-factor method 2.4.4.1 Adjoint 2.4.4.2 Minor 2.4.4.3 Transpose 2.4.4.4 Determinant	
3. Apply Number	3.1 Identification of number systems 3.1.1 Definition of terms	• Practical Activities

Systems	3.1.1.1 Number systems 3.1.1.2 Absolute values 3.1.1.3 Place values 3.1.1.4 Bits 3.1.1.5 Most significant bit 3.1.1.6 Least Significant bits 3.1.1.7 Base 3.1.2 Types of number systems 3.1.2.1 Decimal 3.1.2.2 Binary 3.1.2.3 Octal 3.1.2.4 Hexadecimal 3.2 Base conversion 3.2.1 Decimal to Other number system 3.2.2 Other number systems to decimal 3.2.3 Binary to other number systems 3.2.4 Other number systems to binary 3.3 Number systems arithmetic operations 3.3.1 Binary arithmetic 3.3.1.1 Addition, subtraction, multiplication and division 3.3.2 Complement 3.3.2.1 Prefixing 3.3.2.2 One's complement 3.3.2.3 Two's complement 3.3.3 Octal arithmetic 3.3.4 Addition and subtraction 3.3.5 Hexadecimal arithmetic	• Project work • Demonstration • Group discussions • Observation • Third Party report • Portfolio of Evidence • Written tests

	3.3.6 Addition and subtraction 3.4 Binary codes 3.4.1 Binary coded decimal (BCD) 3.4.2 ASCII 3.4.3 EBCDIC 3.4.4 Gray Code 3.4.5 Excess-3 3.5 Representation of binary coded decimal 3.6 BCD arithmetic 3.6.1 addition 3.6.2 subtraction	
4. Apply logic Gates	4.1 Identification of Logic gates 4.1.1 Definition of terms in logic gates 4.1.2 Types of Logic gates 4.1.2.1 AND 4.1.2.2 OR 4.1.2.3 NOT 4.1.2.4 NAND 4.1.2.5 NOR 4.1.2.6 XOR 4.1.2.7 XNOR 4.2 Application of Boolean Algebra 4.2.1 Logic expressions 4.2.2 Logic circuit diagrams 4.2.3 Truth tables 4.2.4 Laws of Boolean algebra 4.2.4.1 Commutative 4.2.4.2 associative 4.2.4.3 distributive and more 4.2.4.4 identity laws	• Practical Activities • Project work • Demonstration • Group discussions • Observation • Third Party report • Portfolio of Evidence • Written tests

	4.2.4.5 Null laws 4.2.4.6 complement laws 4.2.4.7 commutative laws 4.2.5 De-Morgan's theorems 4.2.6 Application of Karnaugh's Maps 4.3 Application of logic gates 4.3.1 Computer processors 4.3.2 Digital signal processing 4.3.3 Memory devices 4.3.4 Error detection and correction	
5. Perform sequence and series operations	5.1 Summation of sequence 5.1.1 Key terms of sequences. 5.1.1.1 Term 5.1.1.2 Index 5.1.1.3 General term (nth term) 5.1.1.4 Finite sequence 5.1.1.5 Infinite sequence 5.2 Arithmetic series 5.2.1 Arithmetic sum 5.2.2 General form of an arithmetic sequence 5.2.3 Arithmetic progression 5.3 Geometric series 5.3.1 General form of Geometric sequence 5.3.2 Geometric progression	• Practical Activities • Project work • Demonstration • Group discussions • Observation • Third Party report • Portfolio of Evidence • Written tests
6. Demonstrate graph theory	6.1 Key Graph terminologies structure and components of graph 6.1.1 Graph (G) 6.1.2 Vertex/Node	• Practical Activities • Project work • Demonstration

	6.1.3 Edge 6.1.4 Degree of a vertex 6.1.5 Path 6.1.6 Cycle 6.1.7 Connected Graph 6.1.8 Directed Graph (Digraph) 6.1.9 Undirected Graph 6.2 Types of graphs 6.2.1 Bar graphs 6.2.2 Line graphs 6.2.3 Histogram 6.2.4 Ogive curves 6.3 Representation of graphs 6.3.1 Adjacency Matrix 6.3.2 Adjacency List 6.3.3 Incidence Matrix 6.4 Application of graphs 6.4.1 Computer Networks 6.4.2 Social Networks 6.4.3 Transport Networks 6.4.4 Scheduling and Task Management	• Group discussions • Observation • Third Party report • Portfolio of Evidence • Written tests

Suggested Delivery Methods

- Instructor led facilitation using active learning strategies
- Demonstration by trainer
- Practical work by trainees
- Viewing of related videos
- Field Visits

- Group discussions
- Role plays
- Group projects

Recommended Resources for 25 Trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Trainee: Item)
A	Learning Materials			
1.	Textbooks		5 pcs	5:1
2.	Handouts			
3.	PowerPoint presentations	For trainer's use		
4.	Assorted colour of whiteboard markers	For trainer's use	2 packets	
5.	e-Didactics	For trainer's use		
6.	Flashcards			
7.	Flip charts			
8.	Whiteboard			
B	Learning Facilities & infrastructure			
9.	Lecture/theory room		1	25:1
C	Consumable materials			
10.	Printing Papers		1 ream	1:20
11.	Toners		2 pcs	13:1

12.	Internet			
13.	Graph papers		1 ream	1:5
D	Tools and Equipment			
14.	Projectors		1	25:1
15.	Printers		4	6:1
16.	Computers/Smartphones		25 pcs	1:1

SYSTEM ANALYSIS AND DESIGN

ISCED UNIT CODE: 0613 541 02A

TVET CDACC UNIT CODE: IT/CU/ICTA/CC/02/6/MA

Duration of Unit: 110 Hours

Relationship to Occupational Standards

This unit addresses the unit of competency: Perform System Analysis and Design

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.

Summary of Learning Outcomes

Learning Outcomes	DURATION (HOURS)
1. Apply System Analysis and Design concepts	10
2. Apply approaches to system Development and Project planning.	20
3. Perform System Analysis	20
4. Perform System Design	20
5. Perform system testing	10
6. Perform System Implementation	20
7. Perform system maintenance	10
Total hours	**110**

Learning outcomes, Content and Suggested Assessment Methods

Learning outcomes	Content	Suggested Assessment Methods
1. Apply System Analysis and Design concepts	1.1 Identification of system standard constraints 1.1.1 Introduction to system standards constraints 1.1.2 Types of system standards constraints 1.2 Properties of a system 1.2.1 Organisation 1.2.2 Interaction 1.2.3 Interdependence 1.2.4 Integration 1.3 Elements of a system 1.3.1 Control 1.3.2 Input 1.3.3 Process 1.3.4 Output 1.3.5 Feedback 1.3.6 Environment 1.4 System classification 1.4.1 Open system 1.4.2 Closed system 1.4.3 Adaptive system 1.4.4 Non adaptive system 1.4.5 Deterministic system 1.4.6 Probabilistic system 1.5 Types of information systems 1.5.1 Management information system 1.5.2 Transaction processing	• Project • Practical exercises • Written assessments • Observation • Case study • Checklist

	system 1.5.3 Decision support system 1.5.4 Office automation system 1.5.5 Executive support system 1.5.6 Expert system 1.5.7 Knowledge management system 1.5.8 Human resource system 1.6 identification of system models 1.6.1 Physical models 1.6.2 Logical models 1.7 Categories of information 1.7.1 Lower Level 1.7.2 Middle Level 1.7.3 Top Level 1.8 System Analysis and design Concepts	
2. Apply approaches to system Development and Project planning.	2.1 System development Approaches 2.1.1 System development methodologies 2.2 System development life cycle models 2.2.1 Waterfall 2.2.2 Prototyping 2.2.3 Dynamic system Development model (DSDM) 2.2.4 Object oriented model 2.3 SDLC activities 2.3.1 Process and procedure development 2.3.2 Change management	• Project • Practical exercises • Written assessments • Observation • Case study • Checklist

	2.3.3 User experience identification 2.3.4 User impact 2.3.5 Security procedures 2.4 SDLC phases 2.4.1 Planning 2.4.2 Analysis 2.4.3 Design 2.4.4 Testing 2.4.5 Implementation 2.4.6 Maintenance 2.5 Project planning concepts 2.5.1 Introduction to project planning concepts 2.5.1.1 Objectives Resources 2.5.1.2 Schedule 2.5.1.3 Constraints 2.5.1.4 Risks 2.5.1.5 Deliverables 2.5.2 Project planning tools and techniques 2.5.2.1 Program Evaluation and Review Technique 2.5.2.2 Critical Path Methods 2.5.2.3 Gantt charts 2.5.2.4 Risk management tools 2.5.2.5 Budgeting and cost estimation tools 2.5.2.6 Work breakdown structures	
3. Perform System Analysis	3.1 Overview of system Analysis 3.1.1 Role of a system Analyst	• Project • Practical

	3.2 Attributes of structured analysis 3.2.1 Graphic 3.2.2 Logical 3.2.3 Process division 3.2.4 High level to lower-level approach 3.3 Tools and techniques for system analysis 3.3.1 System analysis tools 3.3.1.1 Pseudocode 3.3.1.2 Structured English 3.3.1.3 Decision Trees 3.3.1.4 Decision Tables 3.3.1.5 Data Flow Diagrams 3.3.1.6 Data Dictionary 3.3.2 System analysis techniques 3.3.2.1 Structured analysis 3.3.2.2 Object-oriented analysis 3.3.2.3 Cost benefits analysis 3.3.2.4 Gap analysis 3.3.2.5 Risk analysis 3.4 Performing System analysis activities	exercises • Written assessments • Observation • Case study • Checklist
4. Perform System Design	4.1 Design with Software specification requirements (SRS) document 4.2 Components of system design 4.2.1 Quality 4.2.2 Timeliness 4.2.3 Cost-Effectiveness 4.3 Inputs and outputs of System Design 4.3.1 Inputs of System Design	• Project • Practical exercises • Written assessments • Observation • Case study • Checklist

	4.3.1.1 Statement of work 4.3.1.2 Requirement determination plan 4.3.1.3 Current situation analysis 4.3.1.4 Proposed system requirements including a conceptual data model, modified DFDs, and Metadata (data about data) 4.3.2 Outputs of System Design 4.3.2.1 Infrastructure and organizational changes for the proposed system. 4.3.2.2 A data schema, often a relational schema. 4.3.2.3 Metadata to define the tables/files and columns/data-items. 4.3.2.4 A function hierarchy diagram or web page map that graphically describes the program structure. 4.3.2.5 Actual or pseudocode for each module in the program. 4.3.2.6 A prototype for the proposed system 4.3.2.7 User interface 4.3.2.8 Modularization 4.4 Types of system design 4.4.1 Logical	

	4.4.2 Physical 4.4.3 Architectural 4.4.4 Detailed 4.5 Stages of system design 4.5.1 Requirements determination 4.5.2 Requirements specifications 4.5.3 Feasibility Analysis 4.5.4 Final Specifications 4.5.5 Hardware study 4.5.6 System Design 4.6 Data Modelling techniques 4.6.1 Conceptual 4.6.2 Relational 4.6.3 Object Oriented 4.6.4 Logical 4.6.5 Dataflow diagrams	
5. Perform system testing	5.1 Types of the system testing 5.1.1 Software 5.1.2 Unit 5.1.3 Integration 5.1.4 Usability 5.1.5 Importance of system testing 5.2 System debugging 5.2.1 Common system debugging techniques 5.2.2 System debugging procedure 5.3 Performing system settings 5.4 Developing system testing report	• Project • Practical exercises • Written assessments • Observation • Case study • Checklist
6. Perform System Implementation	6.1 System implementation methods 6.1.1 Direct 6.1.2 Phased	• Project • Practical exercises

	6.1.3 Piloting 6.1.4 parallel 6.2 Selecting appropriate implementation methods 6.2.1 Factors to consider when selecting system implementation methods 6.3 Prerequisite implementation procedures 6.3.1 User training 6.3.2 data conversion 6.3.3 hardware/software acquisition 6.3.4 personnel recruitment 6.4 System deployment 6.4.1 System installation 6.4.2 System documentation 6.4.3 Training	• Written assessments • Observation • Case study • Checklist
7. Perform system maintenance	7.1 System review 7.1.1 Introduction to system review and maintenance 7.1.2 Importance of system maintenance 7.2 Performing system maintenance 7.2.1 Types of system maintenance 7.2.2 System maintenance procedures and policies 7.3 System maintenance report 7.3.1 Components of system maintenance report 7.3.2 Importance of system maintenance report	• Project • Practical exercises • Written assessments • Observation • Case study • Checklist

	7.3.3 Preparation of System maintenance report	

Suggested Delivery Methods

- Demonstration by trainer
- Practical work by trainee
- Viewing of related videos
- Group discussions
- Direct instructions

Recommended resources for 25 trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Trainee: Item)
A	Learning Materials			
1.	Textbooks		5 pcs	5:1
2.	Handouts			
3.	PowerPoint presentations	For trainer's use		
4.	Assorted colour of whiteboard markers	For trainer's use	2 packets	
5.	e-Didactics	For trainer's use		
6.	Flashcards			
7.	Flip charts			
8.	Whiteboard			

B	Learning Facilities & infrastructure			
9.	Lecture/theory room		1	25:1
C	Consumable materials			
10.	Printing Papers		1 ream	1:20
11.	Toners		2 pcs	13:1
12.	Internet			
13.	Graph papers		1 ream	1:5
D	Tools and Equipment			
14.	Projectors		1	25:1
15.	Printers		4	6:1
16.	Computers/Smartphones		25 pcs	1:1

WEBSITE APPLICATION

ISCED UNIT CODE: 0613 551 03A

TVET CDACC UNIT CODE: IT/CU/ICTA/CR/01/6/MA

Duration of Unit: 220 Hours

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Develop Website Application

UNIT DESCRIPTION

This unit covers the competencies required to develop website systems. It involves performing hosting the website, testing the website and maintaining the website.

Summary of Learning Outcomes

Learning Outcomes	Durations (Hours)
7. Perform website Application user need analysis	30
8. Design website application	50
9. Develop website application	60
10. Host the website application	40
11. Test the website application	20
12. Maintain the website application	20
Total Hours	**220**

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
3. Perform Website User Needs Analysis	1.6 Website user requirements identification 1.6.1 Introduction to Web	• Practical test • Projects • Learner Portfolio of

	Programming 1.6.1.1 Definition of key web terms. 1.6.1.2 History of the Internet, the Web, CSS & HTML 1.6.1.3 Web programming/scripting languages 1.6.1.4 Current trends 1.1.4. Importance of websites 1.1.5. Types of websites 1.1.6. Website design requirements 1.6.1.5 Types of user requirements 1.6.1.5.1 Functional requirements 1.6.1.5.2 Non-functional requirements 1.6.1.6 User requirements identification 1.6.1.7 User requirements analysis 1.7 Website user requirements documentation 1.7.1 User requirements documentation tools 1.7.2 Preparation of user requirements specifications document 1.8 Website user requirements	evidence • Oral questioning • Interviews • Third party report • Written tests • Case study

	specifications review 1.8.1 Importance of user requirement review 1.8.2 User requirement review techniques 1.8.3 User requirements specifications validation and verification 1.9 User requirements review process 1.10 Updating user requirements specifications document	
4. Design Website	2.5 Website application design tools 2.5.1 Introduction website design 2.5.1.1 Website design principles 2.5.1.2 Website Design Process 2.5.1.3 User Experience (UX) design 2.5.2 Introduction website design tools 2.5.2.1 Figma 2.5.2.2 WordPress 2.5.2.3 Canvas 2.5.2.4 Wix 2.5.2.5 Adobe Dreamweaver 2.5.3 Factors to consider when selecting design tools 2.5.4 Installation and configuration design tools 2.6 Implementation of website design methods	• Practical test • Projects • Learner Portfolio of evidence • Oral questioning • Interviews • Third party report • Written tests • Case study

	2.6.1 User-Cantered Design 2.6.2 Visual Design 2.6.2.1 Elements of Visual Design 2.6.3 Interaction Design 2.6.4 Wireframing and Prototyping 2.7 Development of website application visual hierarchy 2.7.1 Graphical user interface 2.7.2 Hierarchy of Elements 2.7.2.1 Typography 2.7.2.2 Color and contrast 2.7.2.3 Spacing and Layout 2.7.2.4 Reading patterns 2.7.2.5 Size and scale 2.7.2.6 Proximity and repetition 2.7.2.7 Alignment 2.7.2.8 Texture and style 2.8 Creation of website application site map 2.8.1 Importance of site maps for web design and SEO 2.8.2 Types of site maps 2.8.3 Creating visual site maps 2.8.4 Creating website wireframes	
4. Develop The Website	4.6 Creation of web pages 4.6.1 HTML Coding 4.6.1.1 Introduction to HTML5 4.6.1.2 HTML Tags 4.6.1.2.1 Structural elements	• Practical test • Projects • Learner Portfolio of evidence • Oral questioning

	and attributes 4.6.1.2.2 Formatting HTML documents 4.6.1.2.3 Tables 4.6.1.2.4 Linking Web Pages 4.6.1.2.5 Working with Layouts 4.6.1.2.6 Special effects and Animation using HTML5 4.6.1.2.7 Multimedia 4.6.1.2.8 Managing forms 4.6.1.2.9 DOM 4.6.1.2.10 Events 4.6.1.2.11 HTML frameworks (Bootstrap and Tailwind) 4.6.2 Cascading Style Sheets (CSS) 4.6.2.1 Introduction to CSS 4.6.2.2 Various types of styles sheets 4.6.2.3 Inheritance and cascading order 4.6.2.4 Formatting text, fonts, colours and Background 4.6.2.5 Exploring CSS class and ID attributes 4.6.2.6 HTML Tags 4.6.2.7 Block eleven elements 4.6.2.8 Fundamentals of Document Object Model (DOM) 4.6.3 Website Scripting	• Interviews • Third party report • Written tests • Case study

	4.6.3.1 Functions of scripting languages 4.6.3.2 Types of scripting languages 4.6.3.3 Java scripting 4.6.3.3.1 Introduction to JavaScript 4.6.3.3.2 Statements Syntax 4.6.3.3.3 Values & Variables 4.6.3.3.4 Operators 4.6.3.3.5 Statements 4.6.3.3.6 Event Handling 4.6.3.3.7 Timing Events 4.6.3.3.8 Functions and objects 4.7 Website Backend Creation 4.7.1 Database Creation 4.7.2 Introduction to MYSQL 4.7.3 File systems and databases 4.7.4 Relational database Models 4.7.5 SQL 4.7.6 Entity Relationship modelling 4.7.7 Normalization of database tables 4.7.8 Database design 4.7.9 Working with Database Schemas 4.7.10 Create-Read-Update-Destroy (CRUD) 4.7.11 Joins 4.7.12 Aggregate Functions and Groups 4.7.13 Sub Queries 4.8 Website application frontend and backend integration 4.8.1 PHP	

	4.8.1.1 Importance of PHP 4.8.1.2 Fundamentals of PHP Development 4.8.1.3 Various Data Types 4.8.1.4 Advanced PHP Functions 4.8.1.5 Classes 4.8.1.6 Objects 4.8.1.7 Various Database concepts 4.8.1.8 Cookies and Session Management 4.8.1.9 How to work with forms and system file 4.8.1.10 Error Handling 4.8.1.11 Secure PHP Programming 4.8.1.12 Performance Optimization of PHP Applications 4.8.1.13 Model View Controller (MVC) 4.8.2 Jquery: 4.8.2.1 Introduction to JQuery 4.8.2.2 Selectors 4.8.2.3 Jquery – DOM 4.8.2.4 Jquery Events 4.8.2.5 Ajax 4.8.2.6 UI (User Interface)	
5. Host the Website	5.1 Website application hosting platform 5.1.1 Introduction to website hosting 5.1.2 Types of website hosting services 5.1.3 Factors to consider when selecting a host 5.1.4 Website hosting process	• Practical test • Projects • Learner Portfolio of evidence • Oral questioning • Interviews

	5.2 Server environment setup 5.2.1 Configuring hosting environment (cPanel, Plesk) 5.2.2 Installing web servers (Apache, nginx) 5.2.3 Database set up (MySQL, PostgreSQL) 5.3 Uploading website application files. 5.3.1 Methods of uploading files 5.3.2 Connecting files to the server 5.4 Website server configuration 5.4.1 Importance of website server configuration 5.4.2 Setting up virtual hosts 5.4.3 Configuring directory structures and permissions 5.4.4 Managing server files and directories 5.4.5 Implementing SSL/TLS 5.4.6 Firewall and access control configurations 5.4.7 Backup configuration 5.4.8 Setting server monitoring tools	• Third party report • Written tests • Case study
6. Test The Website	5.1 Website application test plan 6.1.1 Importance of website application testing 6.1.2 Importance of website application test plan 6.1.3 Preparation of website application test plan 5.2 Website application testing techniques	• Practical test • Projects • Learner Portfolio of evidence • Oral questioning • Interviews • Third party report • Written tests

	selection 6.2.1 Types of website application testing techniques 6.2.1.1 Functionality Testing 6.2.1.2 Black box 6.2.1.3 Regression 6.2.1.4 unit 6.2.1.5 Usability Testing 6.2.1.6 Interface Testing 6.2.1.7 Compatibility Testing 6.2.1.8 Performance Testing 6.2.1.9 Security Testing 6.2.2 Factors to consider when selecting website application testing techniques 5.3 Website application testing 6.3.1 Website application testing tools 6.3.2 Website application testing standards, procedures and user requirements 6.3.3 Preparation of website application test data 6.3.4 Perform website application testing 5.4 Test report development 6.4.1 Importance of website application test report 6.4.2 Website application test report development tools 6.4.3 Preparation of website application test report	• Case study.

7. Maintain The Website	7.1 Website monitoring 7.1.1 Importance of website maintenance. 7.1.2 Website monitoring tools 7.1.3 Integrate website monitoring tools (Google analytics) 7.1.4 Analysis of website traffic and performance data 7.2 Development of Monitoring report 7.2.1 Importance of Monitoring report 7.2.2 Website monitoring via logging practices 7.2.3 Preparation of Monitoring report 7.3 Fixing website application bugs 7.4 Updating website application 7.4.1 Updating and archiving of website content 7.4.2 Creation of website pages 7.4.3 Website version upgrading 7.4.4 Vulnerability scans and updates 7.5 Backing up Website 7.5.1 Importance of website data back up 7.5.2 Types of website data back up 7.5.3 Website data backup tools	• Practical test • Projects • Learner Portfolio of evidence • Oral questioning • Interviews • Third party report • Written tests • Case study.

Suggested Methods of Instruction

- Presentations and practical demonstrations by trainer
- Guided learner activities
- Research project assignments
- Supervised activities and projects in a workshop

- The delivery may also be supplemented and enhanced by the following, if the opportunity allows:
    - Visiting expert worker from the ICT sector
    - Industrial visits.

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Trainee: Item)
A	Learning Materials			
1.	Textbooks		5 pcs	5:1
2.	Installation manuals			
3.	Charts			
4.	PowerPoint presentations	For trainer's use		
5.	e-Didactics	For trainer's use		
B	Learning Facilities & infrastructure			
6.	Lecture/theory room		1	25:1
7.	Computer Laboratory		1	25:1
C	Consumable materials			
30.	Printing papers		1 ream	1:20
31.	Toners		2 pcs	13:1
32.	Assorted colour of whiteboard markers			
33.	Internet			

D	Tools and Equipment			
1.	Computers		25 pcs	1:1
2.	Projector		1 pc	25:1
3.	Printers		4 pcs	6:1
4.	Flash drives		5 pcs	5:1
5.	1 External Hard drive		5 pcs	5:1
6.	Software suite		5 pcs	5:1
7.	Hosting server		1 pc	25:1

MODULE 6

UNIT CATEGORY	ISCED UNIT CODE	TVET CDACC UNIT CODE	UNIT NAME	DURATION (HOURS)
CORE	0612 551 04A	IT/CU/ICTA/CR/02/6/MA	ICT Security Management	150
CORE	0613 551 05A	IT/CU/ICTA/CR/03/6/MA	Desktop Application	280
Sub-Total Hours				430
Industrial Training				480
Total Hours				**1,060**

ICT SECURITY

ISCED UNIT CODE: 0612 551 16A

TVET CDACC UNIT CODE: IT/CU/ICTA/CR/02/6/MA

Duration of Unit: 150 Hours

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Manage ICT security.

Unit Description

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

Summary of Learning Outcomes

Learning Outcomes	Duration (Hours)
8. Assess security needs	50
9. Install security control measures	70
10. Maintain ICT system security	30
Total Hours	**150**

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Assess the security needs	1.1. Documentation of ICT security assets 1.1.1. Introduction to ICT security 1.1.1.1. Definition of terms 1.1.1.2. Importance of securing ICT assets	• Practical • Projects • Third Party Reports • Portfolio of

	1.1.1.3. Principles of information security 1.1.1.3.1. Confidentiality 1.1.1.3.2. Integrity 1.1.1.3.3. Availability 1.1.2. ICT security regulations, standards and policies 1.1.2.1. Computer misuse and cyber-crimes act, 2018 1.1.2.2. The data protection act 2019 1.1.2.3. Information security management systems standard (KS ISO/IEC 27001:2022) 1.1.3. ICT security assets 1.1.3.1. Software 1.1.3.2. Hardware 1.1.3.3. Data 1.1.3.4. Network 1.1.3.5. Physical 1.1.3.6. Policy 1.1.3.7. People 1.1.4. Importance of assessing Security needs 1.1.5. ICT security Control Measures 1.1.5.1. Software 1.1.5.2. Hardware 1.1.5.3. Firmware 1.1.5.4. Data	evidence • Written tests

	1.2. ICT security threats 1.2.1. Types of ICT security threats 1.2.1.1. Malware 1.2.1.2. Virus 1.2.1.3. Phishing 1.2.1.4. Hacking 1.2.1.5. Denial of service 1.2.2. ICT security vulnerabilities 1.3. ICT security risk assessment 1.3.1. ICT security risk identification 1.3.2. Conducting ICT security risk assessment 1.3.3. ICT security risk prioritization 1.3.4. ICT security risk levels 1.3.5. Development of mitigation measures 1.4. ICT security risk assessment report 1.4.1. Importance of security risk assessment report 1.4.2. Components of ICT risk assessment report 1.4.3. Compilation of ICT risk assessment report	
2. Install security control measures	2.1 Physical control measures 2.1.1 Introduction to security control measures 2.1.2 Implementation of Physical control measures 2.1.2.1 Grills	• Practical • Projects • Third Party Reports • Portfolio of evidence

	2.1.2.2 Security guards 2.1.2.3 Firewall 2.1.2.4 Locks 2.1.2.5 Burglar proofing 2.1.2.6 Security alarms 2.1.2.7 CCTV 2.2 Logical security control measures 2.2.1 Implementation of logical control measures 2.2.1.1 Firewall 2.2.1.2 Encryption 2.2.1.3 Authentication 2.2.1.4 Authorization 2.2.1.5 Accounting 2.2.1.6 Remote storage 2.2.1.7 Anti – malware 2.2.1.8 Update/Patches 2.3 Testing the implemented ICT security control measures 2.3.1 Types of testing techniques 2.3.2 Testing tools	• Written tests
3. Maintain ICT system security	3.1 Introduction to ICT security monitoring 3.1.1 Importance of monitoring ICT system security 3.1.2 ICT security monitoring tools 3.2 ICT security system monitoring report 3.2.1 Importance of ICT system security monitoring report 3.2.2 Preparation of ICT system security monitoring report	• Practical • Projects • Third Party Reports • Portfolio of evidence • Written tests

	3.3 Updating ICT security system	

Suggested Methods of Delivery

- Presentations and practical demonstrations by trainer;
- Guided learner activities and research to develop underpinning knowledge;
- Supervised activities and projects in a workshop;
- The delivery may also be supplemented and enhanced by the following, if the opportunity allows:
- Visiting lecturer/trainer from the ICT sector;
- Industrial visits.

Recommended Resources for 25 trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Trainee: Item)
A	Learning Materials			
1.	Textbooks		5 pcs	5:1
2.	Installation manuals			
3.	Charts			
4.	PowerPoint presentations	For trainer's use		
B	Learning Facilities & infrastructure			
5.	Lecture/theory room		1	25:1
6.	Computer Laboratory		1	25:1

C	Consumable materials			
7.	Printing papers		1 ream	1:20
8.	Toners		2 pcs	13:1
9.	Assorted colour of whiteboard markers			
D	Tools and Equipment			
10.	Computers		25 pcs	1:1
11.	Password management software		25 pcs	1:1
12.	25-seat license Monitoring tools		25 pcs	1:1
13.	CCTV Cameras		5 pcs	5:1
14.	DVR/NVR Machine		1 Pc	25:1
15.	External DVR Hard disk		1 pc	25:1
16.	CCTV Monitor (24 inch)		1 pc	25:1
17.	25-seat license Antivirus			1:1

DESKTOP APPLICATION

ISCED UNIT CODE: 0613 551 17A

TVET CDACC UNIT CODE: IT/CU/ICTA/CR/03/6/MA

Duration of Unit: 280 Hours

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Develop Desktop Application

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.

Summary of Learning Outcomes

Learning Outcomes	Duration (Hours)
1. Assess desktop application requirements.	50
2. Design desktop application.	70
3. Create desktop application.	80
4. Deploy desktop application	50
5. Maintain desktop application.	30
Total Hours	**280**

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Assess Desktop Application Requirements.	1.1 Desktop application requirements identification 1.1.1 Key concepts and terminologies 1.1.1.1 Importance of desktop application 1.1.1.2 User requirements collection techniques 1.1.1.3 User requirements analysis 1.2 Desktop application requirements specifications documentation. 1.2.1 Desktop application requirements specifications review 1.2.2 Importance of desktop application requirements specifications review 1.2.3 Desktop application user requirements specifications validation techniques 1.3 Preparation of system requirements specifications (SRS) report.	• Practical test • Projects • Learner Portfolio of evidence • Oral questioning • Interviews • Third party report • Written tests • Case study
2. Design Desktop Application.	2.1 Desktop application design requirements 2.1.1 Introduction to desktop application design 2.1.2 Identifying desktop application design tools 2.1.2.1 Types of desktop application design tools 2.1.2.2 Criteria for selecting tools	• Practical test • Projects • Learner Portfolio of evidence • Oral questioning • Interviews • Third party report • Written tests

	2.1.2.3 Case studies of tool selection in real-world desktop application 2.2 Desktop application design methods 2.2.1.1 User-centred Design 2.2.1.2 Visual Design 2.2.1.3 Interaction Design 2.2.1.4 Wireframing and Prototyping 2.3 Desktop application visual hierarchy 2.3.1 Importance of desktop application visual hierarchy 2.3.2 Principles of desktop application visual hierarchy 2.3.2.1 Graphical user interface 2.3.2.2 Hierarchy of Elements 2.3.2.3 Typography 2.3.2.4 Colour 2.3.2.5 Spacing and Layout	• Case study
3. Create Desktop Application.	3.1 Setting up desktop application development environment 3.1.1 Identifying development tools 3.1.2 Overview of desktop application development tools 3.1.3 Criteria for selecting tools based on system requirements 3.1.4 Examples of popular development environments (e.g., Visual Studio, JetBrains, Eclipse) 3.2 Desktop application programming fundamentals 3.2.1 Introduction to programming using C++ or Python or Java languages	• Practical test • Projects • Learner Portfolio of evidence • Oral questioning • Interviews • Third party report • Written tests • Case study

	3.2.2 Overview of programming languages 3.2.3 Programming languages paradigms 3.2.4 Program Development Life Cycle 3.2.5 Program writing using C++ or Python or java. 3.2.6 Basic syntax 3.2.6.1 Importance of syntax in programming 3.2.6.2 Guidelines for naming conventions and best practices 3.2.6.3 General program structures 3.2.6.4 Input and output statements 3.2.6.5 Comments 3.2.6.6 Keywords 3.2.7 Variables 3.2.7.1 Types of variables 3.2.7.2 Variable declaration 3.2.7.3 Variable initialization 3.2.8 Data types 3.2.9 Operators 3.2.10 Program Control structures 3.2.10.1 Sequential 3.2.10.2 Selection 3.2.10.3 Switch statements 3.2.10.4 Iteration 3.2.11 Objects 3.2.12 Functions 3.2.13 Methods 3.2.14 Data structures 3.2.14.1 Arrays	

	3.2.14.2 Pointers 3.2.14.3 Queues 3.2.14.4 Stack 3.2.14.5 Classes 3.2.15 File handling 3.3 Desktop application development 3.3.1 Developing Application Interface 3.3.1.1 Creating the interface as per design 3.3.1.2 Design patterns and frameworks (e.g., MVC) 3.3.1.3 User experience (UX) best practices 3.3.2 Implementing Application Functionality 3.3.2.1 Writing source code 3.3.2.2 Debugging 3.3.3 Database Integration 3.3.3.1 Techniques for integrating databases with applications 3.3.3.2 Using APIs and ORM (Object-Relational Mapping) tools 3.4 Desktop application testing 3.4.1 Identifying Testing Types 3.4.2 Preparing Test Plan 3.4.3 Executing Testing plan 3.4.4 Preparing the Test Report 3.5 Desktop application optimization 3.5.1 Importance of desktop application optimization 3.5.2 Desktop application optimization	

	techniques	
4. Deploy Desktop Application	4.1 Desktop Application Packaging 4.1.1 Overview of desktop application packaging 4.1.2 Distribution of desktop application 4.1.2.1 Desktop application legal and regulatory compliance requirements 4.1.2.2 Best practices for creating installation packages 4.1.2.3 Methods for distributing applications (e.g., direct download, app stores) 4.2 Developing desktop application deployment plan 4.2.1 Importance of desktop application deployment plan 4.2.2 Types of deployment strategies (e.g., phased, big bang) 4.2.3 Assessing desktop application deployment requirements 4.2.4 Developing application deployment plan 4.3 Installation of desktop application 4.3.1 Overview of desktop application deployment tools 4.3.2 Executing desktop application deployment plan 4.3.3 Troubleshooting of desktop application deployment issues 4.4 Desktop application user training	• Practical test • Projects • Learner Portfolio of evidence • Oral questioning • Interviews • Third party report • Written tests • Case study

	4.4.1 Importance of user training 4.4.2 User training approaches 4.4.3 User training resources 4.4.4 Conduct user training 4.4.5 Post-training support	
5. Maintain desktop application.	5.1 Desktop application maintenance scheduling 5.1.1 Importance of desktop application maintenance schedule 5.1.2 Types of desktop application maintenance schedules 5.1.3 Preparation of desktop application maintenance schedule 5.2 Performing Desktop application maintenance 5.2.1 Types of Desktop application maintenance 5.2.2 Back-up and recovery procedures 5.2.3 Desktop application troubleshooting process 5.3 Desktop application maintenance reporting 5.3.1 Importance of Desktop application maintenance report 5.3.2 Identification of reporting tools and software 5.3.3 Preparation of Desktop application maintenance report	• Practical test • Projects • Learner Portfolio of evidence • Oral questioning • Interviews • Third party report • Written tests • Case study

Suggested Methods of Instruction

- Role playing
- Viewing of related videos
- Demonstrations
- Online Training

- Direct Instruction
- Group discussions.
- Instructor led facilitation using active learning strategies.
- Projects.
- Industry visits.

Recommended Resources for 25 trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Trainee: Item)
A	Learning Materials			
1.	Textbooks		5 pcs	1:5
2.	Installation manuals			
3.	Charts			
4.	PowerPoint presentations	For trainer's use		
5.	Assorted colour of whiteboard markers	For trainer's use		
6.	e-Didactics	For trainer's use		
B	Learning Facilities & infrastructure			
7.	Lecture/theory room		1	1:25
8.	Computer Laboratory		1	1:25
C	Consumable materials			
9.	Printing Papers		1 ream	1:20

10.	Toners		2 pcs	13: 1
11.	Internet connection			
D	Tools and Equipment			
12.	Projectors		1	25:1
13.	Printers		4	6:1
14.	Flash drives		5 pcs	5:1
15.	Computers		25 pcs	1:1
16.	Integrated Development Environment (IDEs) – C++, Java and Visual Studio, IntelliJ IDEA, Python IDE		25 pcs	1:1