Ministry of Education and Sports

Technical, Vocational Education and Training (TVET)

MODULARIZED ASSESSMENT GUIDE FOR NATIONAL CERTIFICATE IN INFORMATION AND COMMUNICATION TECHNOLOGY (NCICT)

UGANDA BUSINESS AND TECHNICAL EXAMINATIONS BOARD

2024

TABLE OF CONTENTS

1.0 PROGRAM OVERVIEW

NCICT programme is divided into modules each of which is designed to cover an aspect of the training. The Trainees will be required to undertake modules in Computer Literacy, Computer

Networking, Computer Maintenance and Repair, Website Design and Development and Visual Basic programming.

If a trainee successfully completes a module/a competence area, he/she will have achieved the competencies required toward a strategic ICT occupation and is, therefore, awarded **CERTIFICATE OF COMPETENCY**.

Trainees who intend to complete the full course will be required to handle in addition to the above modules, also add Computational Mathematics, Communication Skills, Entrepreneurship Skills and Basic Kiswahili. All candidates will also be required to come up with practical Real life projects upon completion of each major module (s), and undertake industrial Training at least twice before completion of the entire course.

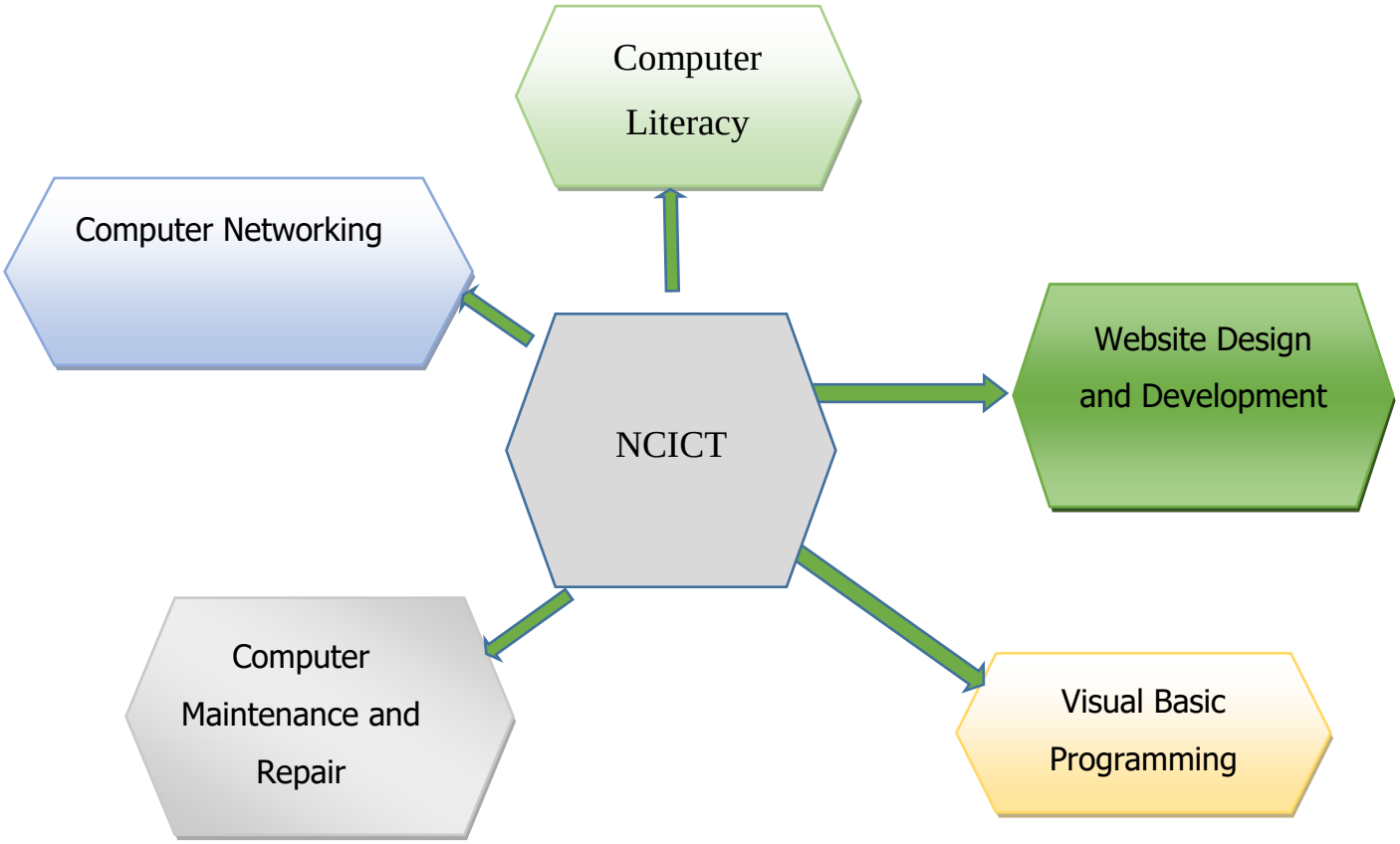
On successful completion of all modules, the trainees shall be awarded the **National Certificate in Information and Communications Technology (NCICT).**

2.0 IDENTIFIED MODULES AND THEIR EXPECTED OUTCOME

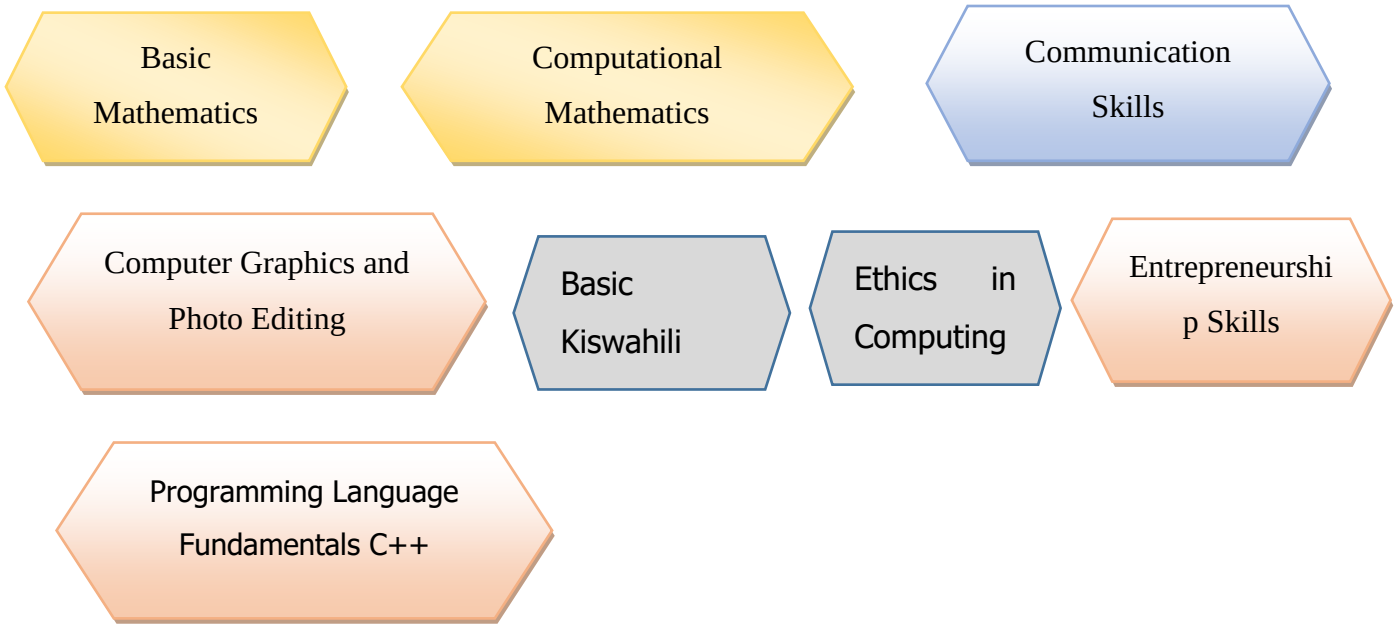
S/N	Modules	Expected Outcome	Award
1	Computer Literacy	operate computer Apparatus and Office programs.	Certificate of competency in Computer Literacy
2	Computer Networking	demonstrate data flow in simple networks, design a network, terminate cables and configure a network connection	Certificate of competency in Networking
3	Computer Maintenance and Repair.	Maintain the computer system, troubleshoot computer related errors and problems and to carryout computer repair.	Certificate of competency in Computer Repair and Maintenance
4	Website Design and Development	Create and design static and Dynamic websites with interlinked pages	Certificate of competency in Website Development
5	Visual Basic Programming	Create simple event driven Applications and databases	Certificate of competency in Database and Visual Programming.
OTHER SUPPORT MODULES			
1	Basic Communication Skills	Apply the basic concepts of communication, demonstrate knowledge and skills of communication and utilize the various forms of communication to communicate effectively in their profession	
2	Basic Mathematics		

3	Computer Graphics and Photo Editing	Apply Adobe Photoshop basics to edit photo	
4	Computational Mathematics	Solve computer science problems using basic mathematical concepts	
5	Computer Ethics		
6	Programming Language Fundamentals C++		
7	Basic Kiswahili		
8	Entrepreneurship Development	Generate Business ideas, identify viable Business resources, and startup businesses	

3.0 MODULE DIAGRAMATIC STRUCTURE



Support Modules



4.0 NCIT MODULAR STRUCTURE

Year One: Semester One

Module 1 & 2 COMPUTER LITERACY & COMPUTER MAITENANCE AND REPAIR						
Assessment Series:						
S.N	**Code**	**Paper Name**	**LH**	**PH**	**CH**	**CU**
1.	NCICT111	Computer Literacy Theory	30	60	60	4
2.	NCICT112	Computer Literacy Practice	15	120	75	5
3.	NCICT121	Computer Maintenance and Repair Theory	30	60	60	4
4.	NCICT122	Computer Maintenance and Repair Practice	15	120	75	5
5.	NCICT123	ICT Project I	10	100	60	4
6.	NCCS112	Basic Communication Skills	30	0	40	3
7.	NCBM113	Basic Mathematics	30	0	40	3
			110	**560**	**390**	**26**

Year One: Semester Two

Module 3	**COMPUTER NETWORKING**					
Assessment Series:						
S.N	**Code**	**Paper Name**	**LH**	**PH**	**CH**	**CU**
1.	NCICT131	Computer Networking Theory	30	60	60	3
2.	NCICT132	Computer Networking Practice	15	120	75	4
3.	NCICT133	Real Life Project II	10	100	60	4
4.	NCICT134	Industrial Training I	15	60	45	4
	NCIT122	Computer Graphics and Photo Editing	10	120	75	3
	NCICT123	Computational Mathematics	30	30	45	3
			110	**490**	**360**	**21**

Year Two: Semester One

Module 4	**WEBSITE DESIGN AND DEVELOPMENT**				
Assessment Series:	**November/December**				
S.N	**Code**	**Paper Name**	**LH**	**PH**	**CH**	**CU**
1.	NCICT241	Website Design and Development Theory	30	60	60	4
2.	NCICT242	Website Design and Development Practice	15	120	75	5
3.	NCICT243	Real Life Project III	10	100	60	4
4.	NCCE211	Computer Ethics	15	60	45	3
5.	NCPF212	Programming Language Fundamentals C++	15	60	45	3
			85	**400**	**285**	**19**

Year Two: Semester Two

Module 5	**VISUAL BASIC PROGRAMMING**				
Assessment Series:	**June-July**				
S.N	**Code**	**Paper Name**	**LH**	**PH**	**CH**	**CU**
1	NCICT251	Visual Basic Programming Theory	30	60	60	4
2.	NCICT252	Visual Basic Programming Practice	15	120	75	5
5.	NCICT253	Real Life Project IV	10	100	60	4
6.	NCICT254	Industrial Training II	15	60	45	3
	NCKS223	Basic Kiswahili	30	60	60	3
	NCED225	Entrepreneurship Skills	30	60	60	3
			130	**460**	**360**	**22**

SUPPORT MODULES

Year One: Semester One	Basic Communication Skills Basic Mathematics
Year One: Semester Two	Computer Graphics and Photo Editing Computational Mathematics
Year Two: Semester One	Programming Language Fundamentals C++ Computer Ethics
Year Two: Semester Two	Basic Kiswahili Entrepreneurship Skills

NOTE:

Students will be required to do real-life projects per semester and Industrial Training as per at the End of Each Academic Year.

5.0 FINAL NCIT EXAMINATION PAPER FORMAT

5.1 YEAR ONE SEMESTER ONE

PAPER CODE AND NAME	EXAMINATION FORMAT
NCICT111- Computer Literacy Theory NCICT121- Computer Maintenance and Repair Theory	Each paper shall consist of **Five** Compulsory questions, each carrying 20 marks. **All** questions carry **equal** marks. The questioning techniques to be applied should seek the candidate's ability to remember, comprehend, apply, analyze, synthesize and evaluate conditions. The total duration of the examination is **3** hours.
NCICT112 Computer Literacy Practical	The paper shall consist of two sections. Section A shall be compulsory with two questions. Section B shall consist of two questions and a candidate will be required to answer only one question. A print out of the practical outputs together with the soft copies of all files used will be sent to the assessing body. The duration of this practical examination shall be 3 hours.
NCICT122- Computer Maintenance and Repair Practice	Each paper shall consist of one compulsory practical question carrying 100 marks and it shall be marked on spot. UBTEB will send an external assessor to assess the trainees as they progress with the examinations. The questioning techniques to be applied should seek the trainee's ability to demonstrate and apply the practical skills acquired during the training. UBTEB will send to the institutions the cutting list of the items needed for practical two weeks for preparation before the examinations date. UBTEB will also send Assessors guide (Special instructions) where necessary to guide the Assessors and Technicians how to arrange the Practice exam.

	The total duration of the examination shall be 6 Hours.
NCICT123 ICT Project I	The paper shall consist of continuous assessment marks. UBTEB shall verify the authenticity of the awarded marks from the completed projects on the ground and trainee's participation through presentations. The tasks to be performed should seek for leaners' ability to comprehend, apply, analyse, synthesize and evaluate conditions. The trainees are expected to: • Typesets documents. • Perform software installations and maintenance • Perform preventive maintenance • Setup and manage a software or stationery kiosk. • Carry out actual installation, maintenance and repair of computers and peripheral devices. The total duration of the examination shall be 90 practical hours.
NCCS112 Basic Communication Skills NCBM113 Basic Mathematics	Each paper shall consist of **eight** questions and the candidate is required to answer any **five. All** questions carry **equal** marks. The questioning techniques to be applied should seek the candidate's ability to remember, comprehend, apply, analyze, synthesise and evaluate conditions. The total duration of the examination is **3** hours.
5.2 YEAR ONE SEMESTER TWO	
NCICT131 Computer Networking Theory	Each paper shall consist of **Five** Compulsory questions, each carrying 20 marks. **All** questions carry **equal** marks. The questioning techniques to be applied should seek the candidate's ability to remember, comprehend, apply, analyse, synthesise and evaluate conditions. The total duration of the

	examination is **3** hours.
NCICT132- Computer Networking Practice	Each paper shall consist of one compulsory practical question carrying 100 marks and it shall be marked on spot. UBTEB will send an external assessor to assess the trainees as they progress with the examinations. The questioning techniques to be applied should seek the trainee's ability to demonstrate and apply the practical skills acquired during the training. UBTEB will send to the institutions the cutting list of the items needed for practical two weeks for preparation before the examinations date. UBTEB will also send Assessors guide (Special instructions) where necessary to guide the Assessors and Technicians how to arrange the Practice exam. The total duration of the examination shall be 6 Hours.
NCICT133- Real life Project II	The paper shall consist of continuous assessment marks. UBTEB shall verify the authenticity of the awarded marks from the completed projects on the ground and trainee's participation through presentations. The tasks to be performed should seek for leaners' ability to comprehend, apply, analyse, synthesize and evaluate conditions. The trainees are expected to: • Typesets documents. • Develop databases • Setup and manage a software or stationery kiosk. • Prepare bills of quantities. • Terminate Ethernet cables. • Configure IP addresses • Set up LAN, WAN, MAN

	• Configure a switch and a router • Manage networked devices The total duration of the examination shall be 90 practical hours.
NCICT134- Industrial Training I	The paper shall consist of continuous assessment marks. The examinations board verifies the authenticity of the awarded marks from the completed projects on the ground and learners' participation through presentations. Industrial Training shall be assessed out of 100 marks and will be carried out at the end of year one The module will be assessed as shown below: Requirements — Contribution Attendance — 10% Work performance involvement — 25% Initiative and innovation — 10% Time management — 10% Discipline and safety — 10% Practical skills — 20% Written report — 15% Total — 100% The total duration of the industrial training shall be six (6) weeks
NCICT123-Computational Mathematics	Each paper shall consist of **eight** questions and the candidate is required to answer any **five. All** questions carry **equal** marks. The questioning techniques to be applied should seek the candidate's ability to remember, comprehend, apply, analyse, synthesize and evaluate conditions. The total duration of the examination is **3** hours.
NCIT122-Computer Graphics and	Each paper shall consist of two compulsory practical

Photo Editing	questions each carrying 50 marks and it shall be marked on spot. The questioning techniques to be applied should seek the trainee's ability to demonstrate and apply the practical skills acquired during the training. The total duration of the examination shall be 3 Hours.

YEAR TWO EXAMINATION FORMATS

5.3 YEAR TWO SEMESTER ONE	
PAPER CODE AND NAME	**EXAMINATION FORMAT**
NCICT241- Website Design and Development Theory	Each paper shall consist of **Five** Compulsory questions, each carrying 20 marks. **All** questions carry **equal** marks. The questioning techniques to be applied should seek the candidate's ability to remember, comprehend, apply, analyse, synthesise and evaluate conditions. The total duration of the examination is **3** hours.
NCICT242- Website Design and Development Practical	Each paper shall consist of one compulsory practical question carrying 100 marks and it shall be marked on spot. UBTEB will send an external assessor to assess the trainees as they progress with the examinations. The questioning techniques to be applied should seek the trainee's ability to demonstrate and apply the practical skills acquired during the training. UBTEB will send to the institutions the cutting list of the items needed for practical two weeks for preparation before the examinations date. UBTEB will also send Assessors guide (Special instructions) where necessary to guide the Assessors and Technicians how to arrange the Practice exam.

	The total duration of the examination shall be 6 Hours.
NCICT243- Real Life Project III	The paper shall consist of continuous assessment marks. UBTEB shall verify the authenticity of the awarded marks from the completed projects on the ground and trainee's participation through presentations. The tasks to be performed should seek for leaners' ability to comprehend, apply, analyse, synthesize and evaluate conditions. The trainees are expected to: • Design web pages. • Design databases and visual interfaces. • Design Desktop applications. The total duration of the examination shall be 90 practical hours.
NCPF212-Programming Language Fundamentals C++ NCCE211-Computer Ethics	Each paper shall consist of **eight** questions and the candidate is required to answer any **five. All** questions carry **equal** marks. The questioning techniques to be applied should seek the candidate's ability to remember, comprehend, apply, analyse, synthesise and evaluate conditions. The total duration of the examination is **3** hours.
5.4 YEAR TWO SEMESTER TWO	
NCICT251- Visual Basic Programming Theory	Each paper shall consist of **Five** Compulsory questions, each carrying 20 marks. **All** questions carry **equal** marks. The questioning techniques to be applied should seek the candidate's ability to remember, comprehend, apply, analyse, synthesise and evaluate conditions. The total duration of the examination is **3** hours.

NCICT252- Visual Basic Programming Practice	Each paper shall consist of **two** compulsory practical question carrying 50 marks and it shall be marked on spot. UBTEB will send an external assessor to assess the trainees as they progress with the examinations. The questioning techniques to be applied should seek the trainee's ability to demonstrate and apply the practical skills acquired during the training. UBTEB will send to the institutions the cutting list of the items needed for practical two weeks for preparation before the examinations date. UBTEB will also send Assessors guide (Special instructions) where necessary to guide the Assessors and Technicians how to arrange the Practice exam. The total duration of the examination shall be 6 Hours.
NCICT253- Real-Life Project III	The paper shall consist of continuous assessment marks. UBTEB shall verify the authenticity of the awarded marks from the completed projects on the ground and trainee's participation through presentations. The tasks to be performed should seek for leaners' ability to comprehend, apply, analyse, synthesize and evaluate conditions. The trainees are expected to: • Design posters, stamps, banners, book covers, receipts, log books, calendars etc. • Design web pages. • Design databases and visual interfaces. • Carry out actual installation and maintenance of computer systems. The total duration of the examination shall be 90 practical hours.

NCIT254 Industrial Training II	The paper shall consist of continuous assessment marks. The examinations board verifies the authenticity of the awarded marks from the completed projects on the ground and learners' participation through presentations. Industrial Training shall be assessed out of 100 marks and will be carried out at the end of year one The module will be assessed as shown below: Requirements — Contribution Attendance — 10% Work performance involvement — 25% Initiative and innovation — 10% Time management — 10% Discipline and safety — 10% Practical skills — 20% Written report — 15% Total — 100% The total duration of the industrial training shall be six (6) weeks
NCED225 Entrepreneurship Development NCSK223 Basic Kiswahili	Each paper shall consist of **eight** questions and the candidate is required to answer any **five. All** questions carry **equal** marks. The questioning techniques to be applied should seek the candidate's ability to remember, comprehend, apply, analyse, synthesise and evaluate conditions. The total duration of the examination is **3** hours.

6.0 ASSESSMENT PLAN FOR NCIT

Examination Series	Assessments	Assessment Components
Year I Semester I Nov-Dec	NCICT111 Computer Literacy Theory	Coursework and Final Assessment
	NCICT112 Computer Literacy Practice	Coursework and Final Assessment
	NCICT121 Computer Maintenance and Repair Theory	Coursework and Final Assessment
	NCICT122 Computer Maintenance and Repair Practice	Coursework and Final Assessment
	NCICT123 Real Life Project I	Coursework, Report and PowerPoint presentation
	NCCS112 Basic Communication Skills	Coursework and Final Assessment
	NCBM113 Basic Mathematics	Coursework and Final Assessment
Year I Semester II June-July	NCICT131 Computer Networking Theory	Coursework and Final Assessment
	NCICT132 Computer Networking Practice	Coursework and Final Assessment
	NCICT133 Real Life Project II	Coursework, Report and PowerPoint presentation
	NCIT122 Computer Graphics and Photo Editing	Coursework and Final Assessment
	NCICT123 Computational Mathematics	Coursework and Final Assessment
	NCICT131 Industrial Training I	Coursework and Report
Year II Semester I Nov-Dec	NCICT241 Website Design and Development Theory	Coursework and Final Assessment
	NCICT242 Website Design and Development Practice	Coursework and Final Assessment
	NCICT243 Real life Project III	Coursework, Report and PowerPoint presentation
	NCPF212 Programming Language Fundamentals C++	Coursework and Final Assessment
	NCCE211 Computer Ethics	Coursework and Final Assessment

Year II Semester II June-July	NCICT251 Visual Basic Programming Theory	Coursework and Final Assessment
	NCICT252 Visual Basic Programming Website Design and Development Practice	Coursework and Final Assessment
	NCICT253 Real life Project IV	Coursework, Report and PowerPoint presentation
	NCED225 Entrepreneurship Skills	Coursework and Final Assessment
	NCSK223 Basic Kiswahili	Coursework and Final Assessment
	NCICT254 Industrial Training II	Coursework and Report

7.0 DETAILED LEARNING CONTENT AND COMPETENCE PER MODULE

7.1 MODULE ONE: COMPUTER LITERACY

7.1.1 MODULE CODE:

7.1.2 MODULE DESCRIPTION

The current trends in assessment require acquisition of demand driven hands-on skills by trainees, modularization of curricula has become a requirement in the Ugandan TVET subsector. The main objective of modularization of assessment is to realign formal TVET assessment to occupational profiles that are available in the world of work or industry.

Computer Application module introduces learners to the use of computers. It will provide learners with basic knowledge and skills to familiarize with the use and working of computer using different modern information communication technologies. The competence certificate in computer Applications prepares a learner for careers such as ICT technical support assistant, data entry clerk, database developer book keeper among others.

This module will enable learners acquire hands on experience in Microsoft office applications such as word processing, spread sheets, power point and database applications, maintenance and troubleshooting of computer resources and use of internet resources that will enable them access, process and, store and disseminate information.

7.1.3 LEARNING OUTCOMES

Upon successful completion of this program, the trainee will be able to:

1. Use and manipulate a computer to prepare documents.
2. Assemble and disassemble computer peripherals
3. Use presentation software to produce slideshows that include ClipArt, pictures, shapes, SmartArt, Tables, Charts, video, and audio, and animates both text and graphics;
4. Prepare presentation of data inform of charts, tabular and graphical forms
5. Generate computational and statistical data using formulae and inbuilt functions.

7.1.4 DETAILED LEARNING CONTENT AND COMPETENCIES

UNIT OF COMPETENCY	COMPETENCIES	TASKS	INDICATIVE SYLLABUS CONTENT	CONTACT HOURS
Computer Fundamentals	The trainee: • Operate a computer with all its accessories • Work and manipulate functions comfortably in Microsoft windows environment • Identify and assess the specifications of a computer • Identify and interpret the different software types and applications • Printing, Scanning and Copying Documents	• Assemble computer components • Change desktop settings • Start and shutdown a computer • Use the different components of a computer • Open different software and	• Definition of a computer • Primary parts of the computer(input, peripherals, processing, memory and storage) • Advantages and disadvantages of a computer Classification of computers • According to make (standalone, dependent, integrated system) • According to purpose (special purpose computers, General purpose computers, dedicated computers) • According to size	60 Hours

			(supercomputers) • The Operating system Types and feature, MS Windows, Linux, Macintosh, Unix, Sun solaris, MS DOS. • The Desktop and icons • File exploration and search • Windows help • Windows default utilities • Storage management (Disk formatting, partitioning and access) • Managing resource and processes. • Fundamentals of file management (copy & paste, Folders & directories, File names, File extensions rules) • File systems and	

			storage computations • Data & information security / protection • Compatibility & third party support of Applications. The Internet • Definition of internet • Types of browsers (Mozilla, opera, Chrome, Netscape) • Internet terminology (Browse, surfing, Email, E-commerce, E-learning, Interactive sites, websites, search engine, URL, connectivity, Bandwidth, Home page, HTML) • Printing documents • Working with printer cartridges and toners	

			• Scanning documents and pictures	
Word Processing	The trainee: • Opens a new document • Retrieves an existing document • Saves a document into a folder or storage medium • Print document • Close a current document • Edit / Correct mistakes in a document (spelling & grammar) • Format a document • Insert objects or Items into a document (pages table pictures) • Use all files command menu	• Create a new document • Typeset word documents • Save typed document • Close and retrieve a document • Edit a document • Format a document • Print a document	Starting MS Word (Opening MS word, explanation of terms (point, click, double click, drag), mouse pointer shapes Some features of MS Word (Title bar, main menu bar, standard toolbar, scroll bars, the rulers in MS Word, portrait VS land scape File command menu(New, Open, Close, saving – save and save as, Page setup, print preview, print, exit View command menu (Can't Undo / Un-do, cant repent / repeat, cut, copy , paste, clear, select all, find, replace View command menu (normal layout, web layout, print layout,	30 Hours

	• Apply appropriate edit commands menu in Editing a document • Insert items/ objects into a document		outline, toolbars, rulers, header and footers, full screen, zoom. Insert Command (page break, page numbers, date and time, symbols, pictures, textbook) Format command menu (Font, paragraph, boarders and shading, columns, drop caps, changing case Tools Command Menu (Spelling and grammar, envelopes and labels, tables, Command menu (Draw table, Insert tables, insert columns, insert rows	
Spreadsheets (Microsoft Excel)	• Load a Spreadsheet application • Enter data in a Spreadsheet. • Edit and format spreadsheet	• Creating a new blank Spreadsheet • Entering data into a Spreadsheet • Saving the	• Loading Spreadsheet application • Entering text/numbers in a worksheet • Home Menu Tab	30 Hours

	information • Applies Spreadsheet formulae to calculate figures • Draw charts, tables, and graphs using Spreadsheet tools. • Print Spreadsheet files	typed Spreadsheet file in a given location • Closing a Spreadsheet • Retrieving an existing Spreadsheet file • Editing and formatting a Spreadsheet file • Making computations using formulas and functions • Printing a Spreadsheet file	(Clipboard, Font, Alignment, Number, Styles, Cells and Editing) group of tools. • Insert Menu Tab (Tables, Illustration, Charts, and Spark lines, Filter, Links, Text and Symbols) group of tools. • Page Layout (Themes, Page setup, Scale to fit, Sheet Option and Arrange) group of tools. • Formulas Menu Tab (Functions Library, Defined Names, Formulae Auditing, & Calculations) group of tools. • Data Menu Tab (Get External Data, Connections, Sort & Filter, Data tools and Outline) group of tools. • Review Menu Tab	

			(proofing, language, Comments and changes) group of tools. • View Menu Tab (Workbook views, show, zoom, window, and macros) group of tools. • Formatting cells (Currency, borders, commas, decimal places, alignment, merging cells, text direction, text wrap) • Computing data with inbuilt functions (Sum, Average, Max, Min, IF, and Count IF) • Formatting cells (currency, borders, commas, decimal places, alignment, merging cells, text direction, text wrap) • Printing a Spread Sheet	

Databases (Microsoft Access)	The learner: • Loads a Microsoft Access application. • Applies database terminologies correctly. • Organises attributes and relations to attain data integrity. • Populates database using the Form object/tool. • Arranges database using Structured Query Language (SQL). • Presents data using the report object/tool.	• Create databases • Design database objects (tables, forms, queries and report) • Apply Combos in databases • Create relationship between two or more tables	Loading Microsoft Access • Object/tools of a database - Table, - Form, - Query - Report • Data attributes • Setting primary and foreign keys • Creating a relationship between 2 tables. • Database normalisation / third normal form (2NF) • Populating a database using electronic forms • Using Reports • Querying a database using clauses (and, or, like) • Computations on captured data (add, subtract, multiply, divide and	30 Hours

			percentages) • Printing database	
Presentation (Microsoft PowerPoint)	• Identify the features of a PowerPoint presentation • Prepare PowerPoint tasks using in built formatting tools • Presents slides with animations and transitions Print slides per page	• Creating a new blank presentation • Entering data into a presentation • Saving the typed presentation file in a given location • Closing a PowerPoint presentation • Retrieving an existing PowerPoint presentation file • Editing a PowerPoint presentation file • Formatting a presentation file • Printing a PowerPoint	• Creating new slide (Title slides, two column text slide and tabular slide) • Preparing Master Slides • Adding notes to slides • Customizing slide presentations • File command menu (New, Open, Close, saving – save and save as, Page setup, print preview, print, exit • Home Menu Tab (Clipboard, Slides, Font, Paragraph, drawing and Editing) group of tools. • Insert Menu Tab (Slides, Tables, Images, Illustration, Links, comments, Text, Symbols & Media) group of	20 Hours

		presentation file (Full slides, Handouts, Outline & Notes pages)	tools. • Design (Themes, Variants and Customize) group of tools. • Transition Menu Tab (Preview, transition to this slide & Timing) group of tools. • Animations Menu Tab (Preview, Animations, and Advanced Animations & Timing) • Slide show Menu Tab (Start slide show, setup & Monitors) • Review Menu Tab (proofing, language, Comments, and compare) group of tools. • View Menu Tab (presentation views, presentation views, show, zoom, and macros) group of	

			tools. • Formatting a slide in form of background design, inserting of clip art and picture, customized animation and transitions, creating slide loops, slide show. Printing slides	
Total Module Duration				**170 hours**

7.1.5 ASSESSMENT STRATEGIES OF THE MODULE

This module will be assessed through evidence based on the trainee's practical work, assignments, tests and final assessment against the set performance standards. Their relative contribution to the final grade is as below:

Requirement	**Contribution**
Assignment	5%
Tests	10%
Practical	25%
Final Assessment	60%

Note

1. All Practical will take place in a computer Lab and will take three hours

7.1.7 TEACHING AND LEARNING RESOURCES

Computer installed with Microsoft Office package

1. Internet
2. Overhead projector
3. Printer
4. Compact discs and Flash discs

5. Printing paper

7.1.8 READING LISTS

1. Tutorials Point (2017). Computers Fundamentals. https://www.tutorialspoint.com/computer_fundamentals/computerfundamentals_tutorial.pdf
2. Fundamentals of Computer. Question bank. http://nmu.ac.in/Portals/0/Question%20Bank/F.%20Y.%20B.%20Sc.(Computer%20Science)%20Paper%20I%20Question%20Bank.pdf
3. Microsoft Word 2013 Part 1 Introduction to Word, free PDF tutorial for Beginners users. https://www.computer-pdf.com/office/word/619-tutorial-microsoft-word-2013-part-1-introduction.html
4. Kennesaw State University, Mail Merge and Creating Forms, programme tutorial training https://www.computer-pdf.com/office/word/475-tutorial-word-2016-mail-merge-and-creating-forms.html
5. Kennesaw State University, Microsoft Word 2016 - Formatting your Document, programme tutorial. https://www.computerpdf.com/office/word/474-tutorial-word-2016-formatting-yourdocument.html
6. Introduction to word 2016. https://www.computerpdf.com/office/word/472-tutorial-introduction-to-word-2016.html
7. Martin, J. (1977). Computer Database Organization. 2nd edn. USA, Prentice Hall.
8. Sanjay, S. (2010), A First Programme in Computers. 2nd edn: Vikas Publishing House. Fred Mugivane (2004). Introduction to Computer. Nairobi, Advatech Office Supplies Ltd.

7.2 MODULE TWO: COMPUTER MAINTENANCE AND REPAIR

7.2.1 MODULE CODE

7.2.2 MODULE DESCRIPTION.

This module introduces the learner to the practical knowledge of maintaining, troubleshooting, repairing and assembling computers.

7.2.3 LEARNING OUTCOMES

By the end of this module, the learner should be able to:

1. Maintain the computer system.
2. Troubleshoot computer-related errors and problems.
3. Carryout computer repair.

7.2.4 DETAILED LEARNING CONTENT AND COMPETENCIES

UNIT OF COMPETENCY	COMPETENCIES	TASKS	INDICATIVE SYLLABUS CONTENT	CONTACT HOURS
Introduction to the personal Computers	The learner: • Describes the construction of personal computer systems. • Explains how personal computer systems work together. • Selects	• Select, Assemble and disassemble computer components and peripherals •	Personal computer systems: • cases and power supplies, internal PC components, external ports and cables, input and output devices Select computer components:	20 hours

	appropriate computer components necessary for Building a computer. • Explains how hardware is configured for task-specific computers. • Carries out hardware configuration for task specific computers.		• Building a computer: select the motherboard, the case and fans, the power supply, the CPU and CPU cooling system, RAM, adapter cards, hard drives, a media reader, optical drives, external storage, input and output devices) Configurations for specialised computer systems: • specialized computer systems (thick and thin clients, CAX workstations, audio and video editing workstations, virtualization	

			workstations, gaming PCs, home theatre PCs)	
Laboratory Procedures and Tools Use	The learner: • Practices safe lab procedures. • Practices proper use of maintenance tools.	• Practice safe lab procedures • Use various tools and software with personal computers	• Safe lab procedures: - procedures to protect people (general safety, electrical safety, fire safety) - procedures to protect equipment and data (ESD and EMI, power fluctuation types, power protection devices) - procedures to protect the environment (safety data sheet, equipment disposal) Proper use of tools:	20 Hours

			• hardware tools (ESD) tools, hand tools, cable tools, cleaning tools, diagnostic tools • software tools (disk management tools, protection software tools • organisational tools (personal reference tools, miscellaneous tools) • demonstrate proper tool use of: antistatic wrist strap, antistatic mat, hand tools, using a multi-meter and a power supply tester, cleaning materials	
Computer Assembly	The learner: • Assembles the	• Assemble different	Assembling the computer:	40 hours

	computer using the correct chronology. • Practices booting of the computer. • Upgrades and configures a computer	computer components • Upgrade various computer components to meet desired user requirements •	• Opening the case and connect the power supply • Installing the CPU and the heat sink and fan assembly on the motherboard before inserting it in the case • Installing RAM • Installing the motherboard in the case • Installing the drives • Installing the adapter cards • Installing the cables Booting the computer: • POST, BIOS, UEFI (BIOS Beep Codes and Setup, BIOS and CMOS, BIOS	

			Setup Program, UEFI Setup Program) • BIOS and UEFI configuration (BIOS component information, BIOS configurations, BIOS security configuration, BIOS hardware diagnostics and monitoring, UEFI EZ mode, UEFI advanced mode) Upgrading and configuring a computer: • Motherboard and Related Components (motherboard component upgrades, upgrade the motherboard, upgrade the	

			BIOS, upgrade CPU and heat sink and fan assembly, upgrade RAM) • Storage devices (upgrade storage devices) • Upgrade storage devices (upgrade input and output devices)	
Computer Preventive Maintenance	The learners: • Describes the benefits and tasks of preventive maintenance. • Carries out the preventive maintenance tasks on personal computers. • Explains the computer troubleshooting process.	• Practice on how to troubleshoot various computer problems	• PC preventive maintenance overview: - benefits of preventive maintenance - preventive maintenance tasks: hardware tasks and software tasks - cleaning the case and internal components - inspecting	30 Hours

	• Executes troubleshooting tasks.		internal components - environmental concerns - guidelines to help ensure optimal computer operating performance • Troubleshooting process: - Troubleshooting Process steps - Common PC problems and solutions	
Operating System installation	The learner: • Describes the operating system requirements • Installs Microsoft Windows and Linux operating system.	•	• Modern operating system: - operating system terms and characteristics - types of operating systems (desktop and network	20 Hours

			operating systems - customer requirements for an operating system (OS compatible applications and environments, minimum hardware requirements and compatibility with the OS platform) - operating systems upgrade (checking OS compatibility, windows OS upgrades, data migration) • Operating system installation: - storage device setup	

			procedures (storage device types, hard drive partitioning, file systems, OS installation with default settings, account creation, finalize the installation, OS installation with default settings, account creation, finalize the installation) - custom installation options (disk cloning, other installation methods, network installation, restore, refresh, and recover, system recovery	

			options) - boot sequence and registry files (windows boot process, start-up modes, windows registry) - multi-boot (multi-boot procedures, disk management utility, partitions, drive mapping or drive letter assignment) - disk directories (directory structures, user and system file locations, attributes, and application, file, and folder properties)	
Windows Configurations and	The learner: • Performs routine	• Practice virtualisation on a	The windows GUI and control panel: • Windows	30 Hours

Management	system management tasks with common Microsoft Windows tools. • Describes the features of client-side virtualization. • Configures virtualization on a computer. • Uses common preventive maintenance techniques for Microsoft Windows operating systems. • Carries out basic troubleshooting for Microsoft Windows operating systems.	computer • Troubleshoot windows Operating system failures • Perform routine system managemen t	desktop, tools and applications • Control panel utilities • administrative tools • disk defragmenter and disk error-checking tool • command line tools Client-side virtualization • purpose of virtual machines • hypervisor: virtual machine manager • virtual machine requirements Common preventive maintenance techniques for operating systems: • preventive	

			maintenance plan contents • updates • scheduling tasks • restore points • hard drive backup Basic troubleshooting process for operating systems: • applying the troubleshooting process for operating systems • common problems and solutions	
Laptops maintenance	The learner: • Explains the purpose and characteristics of laptops. • Configures laptop power settings and wireless settings.	• Repair laptops and Mobile devices • Troubleshoot issues on laptops and mobile devices.	Laptop components • features of laptop components (external features unique to laptops, common input devices and	30 Hours

	• Demonstrates how to remove and install laptop components. • Explains the purpose and characteristics of mobile devices. • Performs common preventive maintenance techniques for laptops and mobile devices. • Troubleshoots laptops and mobile devices.		LEDs in laptops, internal components, special function keys, docking station vs. port replicator) • Laptop displays (LCD, LED, and OLED displays, backlights and inverters, WI-FI antenna connectors, webcam and microphone) Laptop configuration: • power settings configuration • wireless configuration Laptop hardware and component installation and configuration: • Expansion slots • Replacing hardware	

			devices Mobile device hardware overview: • mobile device hardware • other mobile devices Common preventive Maintenance techniques for laptops and mobile devices: • Scheduled maintenance for laptops and mobile devices. Basic troubleshooting process for laptops and mobile devices	
Total Module Duration				220 Hours

7.2.5 PERFORMANCE STANDARDS

- Identify the tools required to perform computer repair and maintenance
- Assemble computer parts and peripheral devices.
- Ability to install operating system on a computer, partition hard disks and perform configurations.

- Troubleshoot computer problems and diagnose possible solutions.

7.2.6 ASSESSMENT STRATEGIES OF THE MODULE

This module will be assessed through evidence based on the trainee's practical work, assignments, tests and final assessment against the set performance standards. Their relative contribution to the final grade is as below:

Requirement	**Contribution**
Assignment	5%
Tests	10%
Practical	25%
Final Assessment	60%

Note

1. All Practical will take place in a computer Lab and will take three hours

7.2.7 TEACHING AND LEARNING RESOURCES

- Computer system
- Repair toolkit
- Operating system
- Drivers pack
- Overhead Projector
- Hard disks, flash disc, and memory cards.

7.2.8 READING LISTS

1. Basic Computer Maintenance. https://www.computerpdf.com/architecture/710-tutorial-basic-computermaintenance.html
2. Computer Architecture. https://www.computer-pdf.com/architecture/75- tutorial-programme -computer-architecture.html
3. Computer Basics. https://www.computer-pdf.com/other/5-tutorialprogrammecomputer-basics-tutorial.html
4. Glenn, B. G. (1991). Computer Systems Concepts and Design. Prentice Hall Jean, A. (2016), CompTIA A+ Guide to IT Technical Support + Lab Manual.

5. 9th edition. Programme Technology Ptr. Mike, M. (2007), Guide to Managing and Troubleshooting PCs. Second Edition. McGraw-Hill, Inc. New York.
6. Mike, M. (2016), Managing and Troubleshooting PCs, Fifth Edition. McGraw-Hill Education Morris, M. (1993). Computer Systems Architecture. Prentice Hall
7. Tanebaum, A. S. (1984). Structured Computer Organization. Prentice Hall William, S. (2003). Computer Organization and Architecture. Prentice Hall

7.3 MODULE THREE: COMPUTER NETWORKING

7.3.1 MODULE CODE:

7.3.2 MODULE DESCRIPTION

This module, introduces the learner to the basics of data communications and networks. It also imparts theoretical and practical skills of linking up computers and sharing computer resources.

7.3.3 LEARNING OUTCOMES

By the end of this module, the learner should be able to demonstrate data flow in simple networks, design a network, terminate cables and configure a network connection.

7.3.4 DETAILED LEARNING CONTENT AND COMPETENCIES

UNIT OF COMPETENCY	COMPETENCIES	TASKS	INDICATIVE SYLLABUS CONTENT	CONTACT HOURS
Network Basics (Introduction to Networks)	The learner: • Evaluates the relevancy of network. • Identifies and uses different network components. • Classifies various network connections. • Understands and punches various types	• Setup a LAN interconnecting up various computers, printers and other devices to communicate. • Configure static IP addresses to computers on a network • Terminate network cables	• Meaning of networks: - Advantages & disadvantages of networks • Network components - Node, NIC and modem - Access point - Hub (active & - passive) - Repeaters & bridge - Switch &	20 Hours

	of connector. • Identifies different LAN topologies. • Assigns IP addresses to network component.		routers • Network cables connectors: - RJ-45 - BNC - db9 serial pinout - DB-25(parallel) • Classification of networks: - LAN - Topologies (ring, star, - bus and hybrid) - WLAN (Wi-Fi and - Bluetooth) - WAN • IP address classes, ranges and subnetting.	
Transmission Media and components	The learner: • Identifies and explains the different transmission media. • Lays out various cables and uses them	• Terminate cables • Establish wireless networks • Detect data transmission errors	• Difference between analog and digital signals. • Forms of data transmission (Simplex, Half duplex, Full duplex)	18 Hours

	appropriately. • Works on guided and unguided / wireless data transmission. • Analyses transmission impairments occurrence and describes how to overcome such errors in analog and digital transmission.		• Layout of various cables and their usage: - Coaxial cable - Twisted pair cable (Cat 5, Cat 6) - Straight through - Cross-over. - Fibre optic cable - Wireless media systems. - Terrestrial microwaves radio waves. - Satellite Wireless communication. - Transmission impairments and errors. - Analog and digital data transmission	
Internet Connectivity	The learner: • Identifies services	• Connect various machines on internet	• Services offered by the Internet	08 Hours

	offered by the Internet. • Discusses the disadvantages of the Internet. • Connects to the Internet. • Creates an email account. • Sends and receives electronic messages. • Searches for information using search engines. • Applies the internet terminologies.	• Browse for content over the internet • Configure internet settings on ICT resources.	• Disadvantages of the Internet • Sending and receiving an email. • Searching for information on the Internet. • Network terminologies: - Peer-to-peer network - Server base network - Hybrid network - Data - Bandwidth - Uploading - Downloading	
Network Troubleshooting	The learner: • Identifies common Network problems. • Examines the causes of network failures. • Applies		• Steps to diagnose a network problem • Causes of network failures • How to prevents causes of	20 Hours

	preventive measures to prevent network failures. • Assigns static IP address. • Connects to a WiFi Connection. • Fixes authentication problem on a WiFi • Re-sets a WiFi Router.		network failures • Troubleshooting basic tools for Windows connection • Guided network - How to connect to a guided network - How to use a static IP instead of the DHCP address • Unguided/Wireless How to connect to a - WiFi network - How to solve authentication problems on a WiFi - How to re-set a WiFi Router	
Network Security	The learner: • Evaluates network risks and threats. • Implements	• Detect Network threats and mitigate them	• Network threats: creating user accounts and regulating	15 Hours

	access controls to the network.		access • Setting passwords and encrypting files	
Administrative tools	The learner: • Describes the roles of various client end /window administrative tools. • Manages various tasks and utilities on the local area network.	• Access windows client end and administrator tools	• Client end/window • User accounts • Event viewer • Performance monitor • Task scheduler • Windows firewall/ defender • Diagnostic tools • Network configuration	20 Hours
Total Module Duration				108 Hours

7.3.5 PERFORMANCE STANDARDS

- Demonstrates data flow in a simple network, design a network, terminate cables and configure a network connection.
- Trouble shoot a network connection to ensure data flow, no packet loss and effective communication.

7.3.6 ASSESSMENT STRATEGIES OF THE MODULE

This module will be assessed through evidence based on the trainee's practical work, assignments, tests and final assessment against the set performance standards. Their relative contribution to the final grade is as below:

Requirement	Contribution
Assignment	5%
Tests	10%
Practical	25%
Final Assessment	60%

Note

1. All Practical will take place in a computer Lab and will take three hours

7.3.7 Teaching and Learning Resources

- Windows 7/Windows 8/windows 10
- Driver Pack 15 and above
- Parket Tracer
- Computers
- Networking Kit
- Overhead projector
- Demos / Videos Manuals

7.3.8 READING LISTS

1. Comer, D. E. (2000). Internetworking with TCP/IP - Principles, Protocols and Architecture (4th ed.). Prentice Hall.
2. Radia, P. (1999). Interconnections: Bridges, Routers, Switches, and Internetworking Protocols. 2nd edn. Addison-Wesley.
3. Hansell, C. W., U.S. Patent 2,389,432, "Communication system by pulses through the Earth".
4. SC Magazine (2014). Network Clarity. Case Study
5. Cisco (2011). What is network security. Retrieved from cisco.com
6. The Froehlich/Kent Encyclopedia of Telecommunications (1997). Security of the Internet. vol. 15. Marcel Dekker, New York. pp. 231–255.
7. Gary, H. and Kellogg (2007). Security Monitoring with Cisco Security MARS. Cisco Press.
8. Duane DeCapite (2006).Self-Defending Networks: The Next Generation of Network Security. Cisco Press.

9. Dale, T. & Greg A. (2006). Security Threat Mitigation and Response: Understanding CS-MARS. Cisco Press.
10. Securing Your Business with Cisco ASA and PIX Firewalls, Greg Abelar, Cisco Press, May 27, 2005.
11. Deploying Zone-Based Firewalls, Ivan Pepelnjak, Cisco Press, Oct. 5, 2006.
12. Perlman, R. and Speciner, M. (2002). Network Security: PRIVATE Communication in a PUBLIC World, Charlie Kaufman |, Prentice-Hall, Angus Wong and Alan Yeung, (2009). Network Infrastructure Security, Springer,.
13. Agrawal, M. (2010). Business Data Communications. John Wiley & Sons, Inc. p. 37.
14. Comer (2000). Protocols are to Communication What Algorithms are to Computation. Sect. 1.3 - Internet Services, p.
15. Comer (2000). Glossary of Internetworking terms, p.686: term encapsulation.
16. Comer, D., E. (2000). Internetworking with TCP/IP - Principles, Protocols and Architecture. 4th edn. Prentice Hall.
17. Internet Engineering Task Force abbr. IETF (1989): RFC1122, Requirements for Internet Hosts -- Communication Layers, R. Braden (ed.). http://tools.ietf.org/html/rfc1122.

7.4 MODULE FOUR: WEBSITE DESIGN AND DEVELOPMENT

7.4.1 MODULE CODE:

7.4.2 MODULE DESCRIPTION

The module introduces Learners to local and wide area network web design and development and, World Wide Web Consortium (W3C) standard mark-up language and services of the Internet.

7.4.3 LEARNING OUTCOMES

By the end of this module, the Learner should be able to use web page authoring tools and graphic software to create simple and usable web sites

7.4.4 DETAILED LEARNING CONTENT AND COMPETENCIES

UNIT OF COMPETENCY	COMPETENCIES	TASKS	INDICATIVE SYLLABUS CONTENT	CONTACT HOURS
HTML programming	The learner: • Applies the syntax of opening, closing, and self-closing tags. • Uses tags to create different elements including the fundamental elements that structure a web page. • Comprehends the workflow of	• Design web pages using HTML	1. Introduction to HTML • Definition of HTML • Simple HTML Documents • HTML Tags • Web Browsers • HTML Page Structure 2. HTML tags • HTML document • HTML headings • HTML paragraphs • HTML links • HTML images • HTML buttons • HTML lists 3. HTML attributes • The Title Attribute • The href attribute • The width and height	60 Hours

	programming and how to read and modify existing code. • The learner alters width, height, and metadata for their images. • Declares the margin between an (X) HTML element and the elements around it.		attributes • The alt attribute • Style attribute 4. Working with HTML Paragraphs • Paragraph tags • The use of line breaks in HTML • How to control the line breaks in HTML • Background colour 5. Working with Images • Adding images • Adding inline images • Title and Alt attribute 6. HTML Styles • Background Colour • Text Colour • Text font • Text size • Text alignment 7. HTML Text formatting • Bold formatting • Italic formatting • Emphasised formatting • Subscript formatting • Superscript formatting • Marked formatting • Marked inserted • Marked deleted	

			• Formatting abbreviations and acronyms 8. HTML Forms • Form with text input • Form with radio button input • Form with text fields and a submit button	
CSS Programming	The learner: • Describes CSS • Changes the styles of the elements using various ways of inserting CSS HTML files. • Reduces file size • Easily maintains web pages • Improves flexibility • Changes the appearance of a selected word leaving other text untouched. • Applies the appropriate padding style. • Sets text colour, line spacing,	•	1. Introduction to CSS • Meaning of CSS • Internal CSS • External CSS • Inline Styles • The Div Tag 2. CSS syntax • The 3parts of CSS syntax • Inheritance • Different States of anchor tag • Sibling and child selector of CSS 3. CSS Classes • Changing the Colour of a selected word while leaving the rest untouched. 4. CSS IDS • Difference between CSS Classes and CSS IDs	70 Hours

	formats and aligns text • Sets font style weight, and size.		5. CSS Margins • Top • Bottom • Right • Left 6. CSS Padding • Meaning of Padding • Single Vs all the four values of an element 7. CSS Text properties • Colour • Line spacing (Normal and Length) • Text Align (Left, Right, Center, Justify) • Text Decoration (Underline, line through, blink) • Text Transform 8. CSS Font properties • Font-family • Font size • Font weight • Word spacing 9. CSS Anchors and links • a:link {Colour: #009900;} • a:visited {Colour: #999999;} • a:hover {Colour #333333;}	

			• a:focus {Colour: #333333;} 10. CSS Background • Background Attachment • Background Colour • Background Image • Background Position 11. CSS Borders • Border Colour (Transparent RGB Colour mode) • Border Style (dashed, dotted, groove etc) • Border Width (Length, Thin, Medium, Thick) 12. Creating a complete website project • Creating the coding of webpage • Creating a basic designing layout for webpage • The header and the navigation Area • The right side Area • Making the main Post • Applying Iframes • Creating Footer • Creating Contact Us	

			page	
Introduction to JAVASCRIPT	• Validate web pages • Program the behaviour of web pages	•	• Explain scripting • Explain the JavaScript language • client-side and server-side JavaScript • variables and data types in JavaScript • JavaScript methods to display information • escape sequences and built in functions in JavaScript • While loop, for loop and do..while loop • break and continue statement • operators and their types in JavaScript • decision-making statements in JavaScript	40 Hours
Database programming (MySQL)	The learner: • Designs MySQL Databases. • Install MySQL database and its environment. • Identify SQL	•	1. Introduction to SQL • Introduction to MySQL language • Data types • SQL statement Syntax • Relational Databases • Relational Operators	60 Hours

	statements for database manipulation. • Write an SQL syntax statement. • Write complex and simple SQL statements. • Demonstrate how to carryout data manipulation statements. • Use database clauses and operators. • Identifies database query constraints. • Uses MySQL database commands. • Manipulates the database queries to optimize the database. • Secures and employ security		• MySQL functions • Installing and upgrading MySQL 2. MySQL and SQL Query Statements • Definitions • Data definition statements • Data manipulation statements: insert, delete, update, create and drop • MySQL transactional and locking statements • MySQL compound-statement syntax • Modifying query statements: renaming, altering tables 3. SQL and MySQL sub queries. • Views: creation, dropping • Joins and Unions: creation • Stored Procedures: benefits • Aggregate functions	

	measures for the database		and grouping • MySQL clauses and operators 4. SQL Processing • Overview of query processing • Query decomposition • Query optimization • Operations - Heuristical processing strategies - Cost estimation 5. Transaction Management • Transaction support • Concurrency control • Threats • Database security, recovery and countermeasures: - Authorization - Views - Recovery and Backup - Integrity - Encryption - Redundant Array of Independent Disks (RAID) • Access control in SQL	
Total Module Duration				230 Hours

7.4.5 PERFORMANCE STANDARDS

- Ability to Use HTML and CSS to design webpages.
- Validate Text boxes, buttons and Align text on a web page.
- Ability to link two or more web pages together using links
- Ability to incorporate images and pictures on the webpage and use of hyperlinks.

7.4.6 ASSESSMENT STRATEGIES OF THE MODULE

This module will be assessed through evidence based on the trainee's practical work, assignments, tests and final assessment against the set performance standards. Their relative contribution to the final grade is as below:

Requirement	**Contribution**
Assignment	5%
Tests	10%
Practical	25%
Final Assessment	60%

Note

1. All Practical will take place in a computer Lab and will take three hours

7.4.7 STUDY MATERIAL

- Computer system with internet connectivity
- Text Editor e.g Chrome
- Tutorials on HTML, CSS, JavaScript and MySQL
- Overhead Projector

7.4.8 READING LISTS

1. Nielsen, J. and Tahir, M. (October 2001), Homepage Usability: 50 Websites Deconstructed, New Riders Publishing, ISBN 978-0735711020
2. Campbell, J. (2017). Web Design: Introductory. Cengage Learning. p. 27.
3. Bureau of Labor Statistics, U.S Department of Labor (2012-). "InformationSecurity Analysts, Web Developers, and Computer Network Architects". Occupational Outlook Handbook, 13 edn.

7.5 MODULE FIVE: VISUAL BASIC PROGRAMMING

7.5.1 MODULE CODE:

7.5.2 MODULE DESCRIPTION

This module introduces the learner to Visual Basic as one of the different programming languages from which computer applications are created. The module is founded on the BASIC language and will provide learners with a variety of tools to create user-friendly applications with Graphic User Interface.

7.5.3 LEARNING OUTCOMES

By the end of this module, the learner should be able to identify the Elements of a Visual Basic Application and create simple event driven applications which encourage higher user interaction through icons, menus, pointers, buttons, and dialog boxes.

7.5.4 DETAILED LEARNING CONTENT AND COMPETENCIES

UNIT OF COMPETENCY	**COMPETENCIES**	**TASKS**	**INDICATIVE SYLLABUS CONTENT**	**CONTACT HOURS**
Elements of a Visual Basic Application	The learner: • Downloads and installs Visual Studio onto their personal computers. • Lists the two elements of a Visual Basic Application. • States the purpose of a	• Explain what Visual Basic toolboxes provides	Creating the Graphical User Interface • Downloading and installing Visuals • Object types and their use - Label - Textbox - Button - Checkbox - Radio Button - List Box	08 Hours

	GUI and what elements does a user see in a GUI. • Explains what a Visual Basic toolbox provides. • Names and describes the most commonly used Toolbox objects.		- Combo Box Time and Picture Box • Coding an Event (stop watch timer)	
Getting stated with Visual Basics	The learner: • Starts Visual Basic .NET • Uses the Toolbox. • Sets the object's properties. • Runs an application • saves and recalls a project.	•	• Starting Visual Basic - Visual Basic .NET Start page - Recent - Open project - New Project dialogue • Using the Toolbox • Initial form Window • Setting an Object's Properties • Running an Application • Saving and Recalling a Project	12 Hours

Visual Basic Data	The learner: • Describes the types of visual basic data. • Uses the dim statements to declare variables.	• use the Dim statements to declare two Numeric Variables and two non-numeric Variables	• Types of Visual Basic Data • Numeric Data • Non Numeric Data • Suffixes and Literals • Declaration of various variables using the dim statements	07 Hours
Managing Visual Basic Data	The learner: • Assigns values to the variables. • Identifies and uses appropriate arithmetic operators.	• Create, categorise and attach values to different variables.	• Assigning Values to the Variables - Mathematical Expression - A number - A string - A Boolean value (True or False) • Arithmetic Operators in Visual Basic Exponential • Multiplication / Division + or & String concatenation.	10 Hours
Controlling Program Flow	The Learner: • Applies the conditional operators. • Identifies and	• Develop a program and use if….. Then….Elseif …..Else	• Getting to know the conditional Operators = Equal to > More Than	10 Hours

	uses appropriate arithmetic operators.	Statements with operators	< Less Than >= More than and Equal to <= Less than and equal to <> Not Equal to • Logical Operators - And - Or - Xor - Not • Using if….. Then….Elseif …..Else Statements with operators	
Adding an Event Procedure code	The learner: • Codes structure of an event procedure in Visual Basic • Codes simple message box • Codes a message box with title and Yes/No buttons • Codes message boxes with title and OK button and information	• Design and run an event procedure using the Message Box, Showing the working method in the form's click event procedure	• Structure of an event procedure • A Simple Message Box • A Message Box with Title • A Message Box with Title and Yes/No Buttons Message Boxes with Title, OK Button, and Information Icon • Correcting Errors	12 Hours

	icon • Debugs a code			
Adding Controls	The learner: • Adds buttons and textbox controls. • Creates on the interface a button with and without focus whereby a user. - Clicks the object. - Presses the tab key until the object receives the focus. - Uses the code to activate the focus. - Designs a form with labels. - Changes forecolour and back colour.	• activate the code window for a form that has a button control and determine the number of event procedures available • create a text box named that has a red foreground colour and a blue background colour	• Simple program interface • Adding Buttons Adding Text Box Control • Setting Initial Properties • Looking at the Focus and Tab Sequence • Label Control (Form With Labels) • Changing Fore Colour and Back Colour	10 Hours
Adding Additional Event procedures	The learner: • Adds a control that activates the message button upon	• Write a Program that Calculates Profit of a business.	• Initial Run Time Window • The Run Time Window after the message button is	06 Hours

	clicking to display the word "Hello world" • Clears the text by clicking the clear button.		clicked	
Total Module Duration				115 Hours

7.5.5 PERFORMANCE STANDARDS

- Design an interface and connect to the database using visual basic and any database management system.
- Knowledge on Visual Basic scripts to be used to design web applications.

7.5.6 ASSESSMENT STRATEGIES OF THE MODULE

This module will be assessed through evidence based on the trainee's practical work, assignments, tests and final assessment against the set performance standards. Their relative contribution to the final grade is as below:

Requirement	**Contribution**
Assignment	5%
Tests	10%
Practical	25%
Final Assessment	60%

Note

1. All Practical will take place in a computer Lab and will take three hours

7.5.7 STUDY MATERIAL

- Computers
- Overhead projector
- Visual Basic software
- Internet
- Online videos or tutorials on use of logical operators

7.5.8 READING LISTS

1. Liew V. K. 2006: Visual Basic 6 Made Easy: (A Complete Tutorial for Beginners). Booksurge, LLC.
2. Introduction to visual basic. Net Http://Www.Jblearning.Com/Samples/0763724785/Ch02_Bronson.Pdf
3. Alessandro, D. S. (2016). Visual Basic 2015 Unleashed. 1st edition. Pearson Education, Inco.
4. Schneider, D. I. (2003). Introduction to Programming with Visual Basic.NET. 5th edn: Prentice Hall.
5. Prentice Hall (2001). A Programmer's Introduction to Visual Basic.NET. 1st edn: Sams Publishing.

8.0 SUPPORT MODULES/PAPERS:

8.1 MODULE: BASIC MATHEMATICS

This module gives the learner a strong mathematical base to be able to tackle further Information Technology (IT) computational problems. This module introduces to the learner the concepts of Algebraic Expressions, Equations and Inequalities, Discrete Structures, Polynomials and Rational Functions, Exponential and Logarithmic Functions.

LEARNING OUTCOME

By the end of this module, the learner should be able to solve computer science problems using basic mathematical concepts.

DETAILED LEARNING CONTENT AND COMPETENCIES

UNIT OF COMPETENCY	COMPETENCIES	TASKS	INDICATIVE SYLLABUS CONTENT	CONTACT HOURS
Algebraic expressions	The learner: • Evaluates real numbers and rational numbers. • illustrates indicial expressions and standard forms and notations of numbers. • develops and represents computer numbering	• Illustrates indicial expressions and standard forms and notations of numbers. • Develops and represents computer numbering systems • Converts computer numbering systems and	Real numbers • Rational numbers • Indices, standard form and notation • Computer numbering systems (binary, decimal, octal, hexadecimal, their conversions and application in digital machines)	08 hours

	systems. • converts computer numbering systems and illustrates their application in digital machines.	illustrates their application in digital machines.		
Equations and Inequalities	The learner: • solves systems of linear equations' • Applies quadratic equations to solve computer related problems. • Solves problems relating variations and inequalities.	• Solves linear equations. • Solves computer related problems involving quadratic equations. • Practices solving situations/equations involving variations. • Practices to evaluate linear and fractional inequalities.	• Linear Equations, • Application of Linear Equations • Quadratic Equation. • Applications of Quadratic Equations • Variations • Inequalities	08 hours
Discrete Structures	The learner: • Solves number relating sets. • Determines the domains and	• Identifies elements of the similar properties. • Solves problems	• Sets (Venn diagrams, complements, Cartesian products, power	12 Hours

	ranges of functions. • Determines the slopes of lines and equations • Plots graphs of functions and relations.	related to sets. • Maps the domain to the range of a function • Plots graphs of functions and relations • Determines the slope of a line.	sets) • Domains and Ranges of Functions • Equations of a Line • Graphs of • Functions and Relations.	
Polynomials and rational functions	The learner: • Simplifies and solves exponential equations. • Solves Logarithmic functions. • Writes solutions to and computes exponential growth or decay.	• Simplifies and solves polynomials / exponential functions. • Writes and computes solutions to the exponential growth or decay problem	• Exponential Equations • Graphing Exponential Functions. • Simplifying Logarithmic Functions. • Change of Base • Solving Logarithmic Equations. • Graphing Logarithmic Functions. • Exponential growth or Decay.	12 Hours
Logarithms	The learner: • Applies the	• Illustrate the theory of	• Theory of logarithms,	06 hours

	theory of logarithms to solve logarithmic functions. • Use logarithm tables to solve equations involving log functions.	logarithms. • Apply the theory of logarithms to solve logarithmic functions. • Use logarithm tables to solve equations involving log functions.	• Common logarithms. Equations involving logarithmic functions,	
Total Module Duration				46 Hours

ASSESSMENT STRATEGIES OF THE MODULE

This module will be assessed through evidence based on the trainee's practical work, assignments, tests and final assessment against the set performance standards. Their relative contribution to the final grade is as below:

Requirement	**Contribution**
Assignment	5%
Tests	10%
Practical	25%
Final Assessment	60%

8.2. COMPUTER GRAPHICS AND PHOTO EDITING

MODULE DESCRIPTION

This module equips the learner with skills of taking abstract internal representation of objects and turning them into images.

LEARNING OUTCOMES

By the end of this module, learners will be able to professionally produce and edit computer graphics.

DETAILED LEARNING CONTENT AND COMPETENCIES

UNIT OF COMPETENCY	COMPETENCIES	TASKS	INDICATIVE SYLLABUS CONTENT	CONTACT HOURS
Getting started with Photoshop	The learner: • Installs and loads Adobe Photoshop. • Navigates the interface. • Setup the document size. • Selects appropriate tools from the toolbox. • Customises/sets the workspace. • Sets required general preferences. • Uses keyboard commands.	• Install adobe Photoshop onto their personal computers • Use selection and paint tools to design basic shapes/pictures	• Installing and loading Adobe Photoshop Navigating the Adobe Photoshop interface. • Menu bar, Workspace, panels and context menus. • Setting-up the document • Creating a New file • Opening an existing file from a disk (Fixed or	12 Hours

			portable media) • View open documents or files importance of the Toolbox • Selection Tools (Move, Marquee, Crop, Magic wand, Lasso, Brush, eye dropper) • Paint Tools (Healing brush, Clone stamp, Eraser, paint bucket, blur and Colour) • Drawing tools (Path, pen, Shape and Text) • View Tools (Free hand, Magnify and background /foreground colour) • Customising the Workspace • Paper orientation, size, and colour mode	

			• Setting general preferences • Using Keyboard Shortcuts	
Working with Layers and Panels	The learner: • Uses design layers and panels to improve images. • Moves, deletes and merges layers. • Enhances layers using Blending mode. • Opens images from storage locations. • Places an image into a workspace. • Zooms images to appropriate levels. • Applies style effects to improve appearance of images. • Improves brightness and contrast of the display.	• Work with basic selection and paint tools to design pictures /shapes.	• Creating new layer, Duplicate layer and Turning a selection into a layer. • Moving, aligning, applying style or transform layers • Deleting, Locking /unlocking • Merging layers Applying pre-set styles to a layer • Copying layer styles • Filling and grouping layers (Opacity, Tolerance, Foreground / background Colour and gradient overlay styles) • Using blending	20 Hours

			modes • Applying design and style effects • Adjusting Colour Brightness /contrast (using levels and curves)	
Working with Images	The learner: • Customises image /picture colours. Removes hot spot from faces already created photos. • Removes an image/object from the project. • Repairs faint or damaged images /photos. • Paints images /shapes. • Retouches photos.	• open a faint or damaged digital photo from a camera, scanner, phone or internet and retouch and correct the photo colour	• Zooming and Panning images • Resizing digital photos • Rotating and aligning images • Moving images • Merging images • Image Correction using; - Removing an object from an image - Adjusting contrast and brightness using curves - Changing background and foreground colours - Changing image	24 Hours

			Colour (Colour vs black and white) - Improving faint images (Adding flash and removing red eye) - Using swatches to customize colours - Retouching photos: - Smoothening photos - Removing the red eye - Removing Hot spots - Adding flash light	
Working with Text and Shapes	The learner: • Draws relevant shapes and text path. • Adds text to an image. • Type the text along a circular text path. • Formats text to improve the appearance.	• design business documents such as a circular stamp for the office of the Guild President, a	• Typing in a design area • Creating a text path • Drawing shapes (circle, rectangle, square) • Typing text along a circular text path • Formatting text	14 Hours

	• Designs business documents. • Paints images/ shapes.	certificate, invitation card and book cover with artistic features	(Font style, size and colour) • Applying design effects to text • Designing business documents (Logos, badges, stamps, certificates, invitation cards, receipts, banks lips, book covers) • Painting images /shapes	
Using auto commands, saving and printing	The learner: • Uses auto commands • Designs posters, stamps, banners, receipts and book covers. • Saves files/projects in a desired format (pdf and jpeg). • Creates an email account and sends an email of the designed project. • Prints projects/files.	• Correct images /photos using auto command. • Convert file formats to PSD and PDF, and printout a copy of the project.	• Auto Tone, Colour and Contrast. • Colour swatches • Creating and using gradients. • Saving into different file formats (JPEG, PDF, print applications). • Printing • Creating email account. • Emailing a	05 Hours

			designed project	

PERFORMANCE STANDARDS

- Design business documents such as a circular school stamp, a certificate, invitation card and book cover with artistic features.
- Ability to edit images and repair faults in images.
- Ability to save the projects in various forms and kinds

ASSESSMENT STRATEGIES OF THE MODULE

This module will be assessed through evidence based on the trainee's practical work, assignments, tests and final assessment against the set performance standards. Their relative contribution to the final grade is as below:

Requirement	**Contribution**
Assignment	5%
Tests	10%
Practical	25%
Final Assessment	60%

Note

1. All Practical will take place in a computer Lab and will take three hours

8.3 MODULE: COMPUTATIONAL MATHEMATICS

This module gives the learner a strong mathematical base to be able to tackle further Information Technology (IT) computational problems. The module brings together mathematical topics which are commonly used in the general computer science. It builds a foundation for other modules that need special mathematical backgrounds The Student for this Module is expected to have knowledge of Basic Mathematics i.e Algebraic expressions and Equations and Inequalities, .

LEARNING OUTCOME

By the end of this module, the learner should be able to solve computer science problems using basic mathematical concepts.

DETAILED LEARNING CONTENT AND COMPETENCIES

UNIT OF COMPETENCY	COMPETENCIES	TASKS	INDICATIVE SYLLABUS CONTENT	CONTACT HOURS
Boolean Algebra	The learner: • Evaluates Boolean variables. • Illustrates the laws of Boolean algebra. • Constructs logic statements. • Develops compound statements • Constructs truth tables.	• Apply the laws of Boolean algebra to construct logic statements and truth tables	**Boolean variable**, - Addition - Subtraction - multiplication **Boolean algebra,** - laws of Boolean algebra, - logic statements, - compound statements, - truth tables	08 Hours

Linear Algebra	The learner • Evaluates homogeneous and nonhomogeneous linear equations. • Illustrates and solves matrix equations. • Illustrates matrices, determinants and the properties of determinants. • Solves for minors and cofactors in matrices. • Evaluates classical ad joints and illustrates Cramer's rule.	• Evaluate matrices and classical ad joints	• Linear equations: - systems of linear equations, homogeneous equations - nonhomogeneous equations • Matrices: - matrix algebra, - identity matrix, - transpose of a matrix, - matrices and systems - of linear equations, - elementary row operations and echelon matrices • Types of matrices, determinants: the determinant, • Properties of determinants, • Minors and cofactors, • Classical ad joint, Cramer's rule	20 Hours
Introduction to Differential and integral	The learner: • Solves differential	• Evaluate differential and integral	• Differential calculus • Integral (single integral) calculus	08 Hours

calculus	equations. • Evaluates single integrals.	calculus		
Probability Theory	The learner • Evaluates probability using the different approaches. • Manipulates the properties of probabilities. • Determines the different elements of a sample space. • Evaluates discrete random variables.	• Research on the concept of probability and sample space, and write reports	• **Concept of probability** - axiomatic approach, - relative frequency approach, - probability as a function of the sample space, probability of an event, - properties of probabilities of events, addition and multiplication laws • **Concept of sample space:** - sample space sample point tossing a coin rolling a die independent events exclusive events mutually exclusive events • Discrete random	16 Hours

			variables	
Numerical Methods	The learner: • Demonstrates modelling of flow charts and dry runs. • Determines and illustrates loops from decision boxes.	• Model flow charts of a computer program and illustrate loops.	• **Concept of probability:** - Introduction to flow charts and dry runs - Concept of loops from decision boxes	08 Hours
Total Module Duration				84 Hours

PERFORMANCE STANDARDS

- Ability to identify and differentiate between sets of elements.
- Ability to identify and map the range to its domain
- Ability to solve an exponential decay or growth problem
- Ability to construct a truth table using Boolean algebra
- Perform and construct simple tasks using matrices
- Differentiate and integrate computational problems.
- Appropriate decision making using probability theory

ASSESSMENT STRATEGIES OF THE MODULE

This module will be assessed through evidence based on the trainee's practical work, assignments, tests and final assessment against the set performance standards. Their relative contribution to the final grade is as below:

Requirement	**Contribution**
Assignment	5%
Tests	10%
Practical	25%
Final Assessment	60%

8.4 MODULE: COMMUNICATION SKILLS

Module Overview

This programme introduces the learner to basic knowledge and skills of effective communication within their environment.

Learning Outcome

By the end of this module, the learner should be able to apply the basic concepts of communication, demonstrate knowledge and skills of communication and utilize the various forms of communication to communicate effectively in their profession.

DETAILED LEARNING CONTENT AND COMPETENCIES

UNIT OF COMPETENCY	COMPETENCIES	TASKS	INDICATIVE SYLLABUS CONTENT	CONTACT HOURS
Introduction to Communication	The learner: • Defines communication. • Identifies the importance of communication in business. • Classifies the categories of communication. • Applies the different forms of communication.	• Lead guided discussion on types and forms of • communication	Meaning of communication • Importance of communication • Classification of communication (Internal and External) • Forms of communication (Formal and Informal)	08 Hours
Grammar	The learner: • Applies the correct	•	• Parts of speech (nouns, pronouns, verbs, adverbs,	04 Hours

	grammar in speeches. • Spells words correctly. • Construct sentences with the right tenses. • Pronounces words correctly.		adjectives, conjunctions and interjections) • Spellings • Tenses • Pronunciation	
Communication Process	The learner: • Describes the elements of communication. • Develops the communication channel. • Identifies barriers to Effective communication. • Identifies solutions to the barriers to effective communication.	•	• Elements of communication process • Channels of communication • Barriers to effective • Communication • Solution to the barriers of communication	08 Hours
Written Communication	The learner: • Writes business correspondence • Writes reports. • Prepares	• Write business letters, memos, notices and reports	• Business letters Curriculum vitae Business reports • Memorandum • Notices	10 Hours

	memos.			
Oral Communication	The learner: • Justifies the importance of oral communication • Organises meetings • Negotiates for better business terms. • Makes effective public speeches.	• Write minutes for a meeting	• Importance of oral communication • Meetings • Negotiations • Public speeches	08 Hours
Listening	The learner: • Justifies the importance of effective listening. • Listens effectively. • Identifies the causes of poor listening skills.	•	• Importance of listening • Barriers to effective listening	05 Hours
Non – Verbal communication	The learner: • Applies non-verbal communication to express feelings.	•	• Types of nonverbal communication - Body language - Facial expressions - Gestures	06 Hours

	• Interprets the nonverbal communication made by others correctly. • Analyses the advantages and disadvantages of nonverbal communication.		- Postures • Eye contact • Advantages and disadvantages of non-verbal communication	

ASSESSMENT STRATEGIES OF THE MODULE

This module will be assessed through evidence based on the trainee's practical work, assignments, tests and final assessment against the set performance standards. Their relative contribution to the final grade is as below:

Requirement	**Contribution**
Assignment	5%
Tests	10%
Practical	25%
Final Assessment	60%

8.5 MODULE: COMPUTER ETHICS

Module Overview

This module is a new branch of ethics that will enable the learners to demonstrate ethical behaviour in the field of information and communication technology that is growing and developing rapidly..

LEARNING OUTCOME

By the end of this module, the learner should be able to describe the importance of ICT ethical behaviours and observe computing ethics while carrying out professional duties.

DETAILED LEARNING CONTENT AND COMPETENCIES

UNIT OF COMPETENCY	COMPETENCIES	Teaching and Learning Strategies	INDICATIVE SYLLABUS CONTENT	CONTACT HOURS
Introduction to Computer Ethics	The learner: • Describes the meaning and different forms of ICT ethics. • Applies the different categories of ethical behaviours when using the computer. · describes the importance ICT of ethical behaviour to	• Brainstorm the meaning of ethics and the different ICT ethics. • Brainstorm the unethical behaviours of computer users in society. • Lead a guided discussion on the forms of ICT Ethics.	Meaning of ethics • Forms of ICT Ethics • The ethics of using computers between the person and the same. • The ethics of using computers between the persons. • Ethics between the user and device. • Importance of Ethical behavior to a user	12 Hours

	users..	• Lead a guided discussion on the importance of Ethical behaviours to different users.		
Scenarios of Computer Misuse and effects to society	The learner: • Analyses the effects of a computer misuse. • Identifies the effects of computer misuse.	• Lead a guided discussion on situations involving computer misuse. • Brainstorm with the learners about the effects of computer misuse.	• Media/software piracy • Intellectual property theft • Ransom ware attacks • Identity theft • Financial theft • Pornography	08 Hours
Forms of Computer Software attacks	The learner: • Identifies threats to computer software. • Documents the software attacks	• Lead a guided discussion on the various software attacks. • Brainstorm	Attack form • Viruses • Worms • Trojan horses • Denial Of Service • Brute force • Steps to mitigate	08 Hours

	for mitigation. • Mitigates cyber threats systematically.	the methods of mitigating the threats caused by the software attacks. • Lead a guided discussion on the 5 steps to mitigate cyber threats.	cyber risks	
Ethical challenges of IT	The learner identifies the ethical challenges encountered in IT.	• Lead a guided discussion on each of challenges encountered in IT giving examples. • Task learners to establish solutions to each of the challenges.	Security • Privacy issues • Copyright infringement • Increased pressure on IT Experts • Digital divide	08 Hours
Ethical code of conduct in ICT	The learner applies the 10 commands of	• Lead a guided discussion on	• The 10 commandments of computer ethics	09 Hours

	Computer ethics.	the 10 commandments of computer use. • Brainstorm the importance cyber laws in Uganda.	• Importance of a cyber law	

ASSESSMENT STRATEGIES OF THE MODULE

This module will be assessed through evidence based on the trainee's practical work, assignments, tests and final assessment against the set performance standards. Their relative contribution to the final grade is as below:

Requirement	**Contribution**
Assignment	5%
Tests	10%
Practical	25%
Final Assessment	60%

8.6 MODULE: PROGRAMMING LANGUAGE FUNDAMENTALS C++

Module Overview

This module is intended to create a strong base in the principles and practiceof functional programming. A high level programming language like C++ is to be used. Students are to cover both theoretical principles and hands-on practical skills. The main concepts to cover include program structure, data structures, syntactical and semantic correctness, planning and segmentation in programming.

Learning Outcomes

By the end of this module, the learner should be able to:

(i) Describe how computing uses or benefits from programming fundamentals.

(ii) Identify the appropriate paradigm for a given programming problem.

(iii) Use a suitable programming language to implement, test, and debug algorithms for solving simple problems.

UNIT OF COMPETENCY	COMPETENCIES	TASKS	INDICATIVE SYLLABUS CONTENT	CONTACT HOURS
Introduction to C++	The learner: • Describes the theory of object oriented Programming and its techniques. • Describes the advantages and Disadvantages of object oriented programming. • Describes the Characteristics of C++ and its capabilities.	• Lead a guided discussion on the theory of the object oriented programming, its advantages and disadvantages. • Lead a guided discussion on the characteristics of C++ and its capabilities.	• Introduction to the theory of the object oriented programming, advantages and disadvantages • Characteristics of C++ programming Language Capability of C++ language – portability. • Procedural (modular) and structural nature of C++ programming	06 Hours
Evolution of	The learner	Lead a guided	Machine	4 Hours

programming Language	demonstrates an understanding of machine languages e.g. low level languages and high level languages with examples.	discussion on the machine language. Lead a guided discussion on the high level and low level language and illustrate with examples.	language, low level language e.g. assembly programming language, high level programming language	
Solving a problem on a computer	The learner: • Demonstrates the 6 key steps in an overview for solving a problem on a computer. • Designs a solution strategy for the problems. • Writes the computer program corresponding to the algorithm. • Demonstrates the various program development methods and programming paradigms (top down design vs. bottom up design)	Lead learners through the process of designing a solution strategy: Guide learners in groups to write the computer program corresponding to the algorithm. Guide learners to practice the program development methods and programming paradigms (top down design vs. bottom up design).	Defining the Problem • The steps in solving the problem. • Developing an algorithm (a method) for solving the problem. • Writing the computer program corresponding to the algorithm. • Testing and debugging the program. • Documenting the program. • Designing a solution strategy: developing an algorithm. • Comparing and contrasting various methods of algorithm i.e. natural languages, flow charts, etc. • Writing the computer program corresponding to the algorithm. • Program development methods and programming	20 Hours

			paradigms (to down design vs.bottom up design)	
The Hello world program	The learner: • Explains and compares "Hello world" program statements and other syntax rules. • Demonstrates input/output practical examples. • Describes the integrated development/ Programming environment. • writes the basic syntax.	Guide learners to identify and demonstrate more I/O practical examples (*Console Input/ Output: printf(), scanf(), getchar() and putchar(), getch() and getche()*). Guide learners to describe the integrated development/ C programming environment.	• Explanation and comparison of statements i.e. libraries used, inbuilt functions (main (), printf(), and other syntax rules implemented). • More I/O practical examples (*Console Input/ Output: printf(), scanf(), getchar() and putchar(), getch() and getche()*. • The integrated development/ C programming environment. • Basic syntax	6 Hours
Data types, Variables and Constants	The learner: • Identifies and modifies the basic data types. • Declares variables. • Defines variable names. • Performs initializing of variables. • Defines the different storage classes and constants.	Guide learners to identify and modify the basic data types. Guide learners through demonstrations on how to declare variables and define variable names. Lead learners' practice to perform initialising of variables. Task learners in groups to define the different	• Data type: basic data types, modifying basic types Variables and constants. • Declaration of variables and variable names. • Initialising variables • Storage classes and constants	8 Hours

		storage classes and constants.		
Expressions and Operators in C++	The learner: • Writes expressions and operators used in C++ programming. • Illustrates the precedence of operators.	• Guide learners using demonstrations to write the different expressions and operators used in C++ programming. • Lead learners through practice to illustrate the precedence of operators.	• Arithmetic operators • Assignment operators • Relational operators • Logical operators • Increment and decrement • operators • Conditional operators • Bitwise operators • Size of operator • Special operators • Type casting • Precedence of operators	8 Hours
Statements in C++	The learner: • Writes decision making statements. • Writes and explains the C++ iteration statements.	Guide learners using illustrations to develop decision statements such as: if statement, if…else statement, nested if statements, if - else - if ladder, the break and switch statement. • Lead learners to practice the use of	Decision statements: - if statement - if…else statement - nested if statements - if - else - if ladder - the break and switch statement Iteration statements: - for statement - while statement - do while - nested loops - the infinite loop - loop control statements	8 Hours

		iteration statements to include: for statement, while statement, do while, nested loops, the infinite loop, loop control statements.		

8.7 MODULE: ENTREPRENEURSHIP SKILLS

MODULE DESCRIPTION:

This module will equip the learner with creative and innovative skills and ability to look out for opportunities by manipulating the natural and man-made resources into business.

It covers creativity and innovation, scanning the environment for business opportunities, planning a business, managing a business, and entrepreneurial ethics.

LEARNING OUTCOME

By the end of this module, the learner should be able to:

- Develop viable business ideas.
- Choose appropriate business entry option
- Choose appropriate source of business finance
- Start a business
- Manage a business

DETAILED LEARNING CONTENT AND COMPETENCIES

UNIT OF COMPETENCY	COMPETENCIES	TASKS	INDICATIVE SYLLABUS CONTENT	CONTACT HOURS
Work and Career	• Differentiate	• Define work,	• Types of work.	15 Hours

Opportunities	between work, career and employment. • Outline the reasons why people go in to wage or self-employment. • Understand the reasons why unemployment persists	dignity of work, career and employment. • Identify various career opportunities. • Explain causes and remedies of unemployment.	• Work in the community. • Dignity of work. • Importance and values of work status in society. • Meaning of career opportunities. • Employment. • Advantages and disadvantages of wage and self-employment.	
Concept of Entrepreneurship	• Differentiate between business person and an entrepreneur. • Give the qualities of an entrepreneur. • Identify the barriers to entrepreneurship development. • Propose ways to	• Describe the entrepreneurship process.	• Meaning of: entrepreneurship, an entrepreneur, entrepreneurship. • Characteristics of entrepreneurs • Types of entrepreneurs • Types of entrepreneursh	12 Hours

	overcome the challenges faced by an entrepreneur.		ip • Role of entrepreneur in business • Benefits of entrepreneurship • Barriers to entrepreneurship development. • Role of government in promoting entrepreneurship	
Business ideas	• Mention the sources of business ideas • Generate business ideas • Screen the ideas. • Carry out a market survey/assessment. • Take proper decision for a business idea. • Write a simple	• Identify viable business idea • Prepare Business Plan.	• Sources of business ideas • Methods of generating business ideas • Qualities of good business ideas • Selecting a business incubator and factors to consider • Business plan	30 Hours

	feasibility report. • Start a business. • Explain the components of Business Plan • Prepare a simple business plan.		• Factors to consider when making a business plan • Components of a business plan	
Legal forms of business ownership	• Identify the forms of business. • Understand the advantages and disadvantages of legal forms of business ownership.	Choose appropriate business entry option	• Form of business: sole proprietorship, partnership, joint stock, cooperatives. • Features, advantages and disadvantages of each. • Factors to consider while choosing a form of business	20 Hours
Operationalization of business	• List the sources of business funds • Identify Marketing Mix Variables. • Build a relationship and Customer satisfaction	• Choose appropriate source of business finance • Operationalize a business	• Sources of business finance • Factors to consider in choosing business finance • Factors to	20 Hours

			consider in choosing business location • Statutory requirements: business name and registration, business permit, health/safety certificate • Marketing Mix variables: Product, Price, promotion Place/ Distribution. • Strategies for winning and retaining customers • Importance of the product packaging: • Importance Customer satisfaction	
Small Business	• Identify small		• Characteristics	18 Hours

Enterprise	business • Recognize the characteristics of small business. • List the area of small business opportunities. • Outline the role of small business. • Explain the challenges / problems facing small business.		of small business. • Different small business areas: tailoring shop, beauty salon, bakery, trading, catering etc. • Roles that small business plays in the country. • Challenges facing small business	
Enterprise Management	• Identify the different management functions. • Design an organization structure. • Analyze the role of government in entrepreneurship development. • Implement a simple business plan. Manage the business. • Prepare a job	• State objectives of a business. • Design an organization structure of a business. • Make a business plan. • Identify the challenges involved in making a business plan. • Communicate effectively and efficiently.	• Meaning and scope of management. • Functions, purpose, need for management. • Principles of management • Importance of manager's proficiency. • Planning: identifying need, problems of planning,	40 Hours

	description.	• Set strategy measures to ensure continuity of a business. • Explain the role of an entrepreneur in each functional management of a business organisation.	setting objectives, developing strategies. • Organising: Organisation structure, job description, responsibilities, and qualifications. • Staffing: selection and recruitment, orientation, training, development of personal communication, channels of communication effective and ineffective communication. • Directing: delegating, motivating, coordinating and managing change.	

			• Problem solving: appraisals, solutions. • Controlling: reporting, rewarding, motivation, remuneration. • Functional management: production, purchasing, administration, marketing, financial, communication. • Market assessment: meaning, factors for assessing market potential, qualities considered, features, constraints. • Market survey: definition,	

			qualities of a market research, competition, decision making, business success and failure.	
Income of an entrepreneur.	• Make savings • Make investments. • Maintain proper accounting records. • Prepare a simple profit and loss statement, balance sheet and cash flow budget.	• Make a plan for savings. • Invest part of the income. • Keep proper records of Income flow.	Business funding: types and sources of funds. Income, saving and investments Record keeping: source documents, ledgers, final accounts.	25 Hours
Total Module Duration				180 Hours

PROJECT WORK

- Generate a business idea in your area of residence. Give reasons for the idea and explain how you will manage the business.
- Start up a simple business.

Note This is just a sample of project a learner can do to appreciate what he/she has learned about Entrepreneurship. There can be many others.

ASSESSMENT STRATEGIES OF THE MODULE

This module will be assessed through evidence based on the trainee's practical work, assignments, tests and final assessment against the set performance standards. Their relative contribution to the final grade is as below:

Requirement	Contribution
Assignment	5%
Tests	10%
Practical	25%
Final Assessment	60

8.9 MODULE: BASIC KISWAHILI

Module Overview

This module introduces the learner to the basic Kiswahili used in the industry and by the general public to carry out daily business. It also enables the learner to carry out his/her profession in any part of East Africa where Kiswahili is the major language of communication.

Learning Outcome

By the end of the module the learner should be able to seek help on ICT matters in Kiswahili.

DETAILED LEARNING CONTENT AND COMPETENCIES

UNIT OF COMPETENCY	COMPETENCIES	TASKS	INDICATIVE SYLLABUS CONTENT	CONTACT HOURS
Introduction to Kiswahili	The learner • Acknowledges the importance of learning and using Kiswahili language.	•	• Origin and spread of Kiswahili • Importance of Kiswahili to Ugandans and other East African countries	02 Hours
Polite language	The learner: • Greets peers and elders in Kiswahili.	•	• Greetings to peers, age mates, parents, elderly and supervisors • Salutations at different	18 Hours

	• Names places and people in their capacities. • Appreciates others by saying 'thank you' and `well-done' in Kiswahili.		times of the day • Appreciation and saying `thank you' for work done, gifts, food and so on • Asking for directions, assistance and food and so on • Names of places, like schools, hospitals, markets, garages, roads, airports, water wells, forests, villages, towns, sites, hills • Names of people and professional titles like technicians, nurses, messengers, watchmen, drivers, doctors, teachers, learners	
Comprehension	The learner : • Counts numbers 0 -1000000 in Kiswahili. • Identifies and names the parts of the human body in Kiswahili.	•	Vowels a e i o u • Consonants b, ch, d, dh, f, g, gh, h, j, k, l, m, n, ng, ny, p, r, s, sh, t, th, v, w, y, z. • Counting and numbers 0-9, 10- 1000000 • Daily and common activities and sayings,	10 Hours

	• Acknowledges the importance of learning and using Kiswahili language.		welcome, have a seat, thank you, wish you well, sorry. • Parts of the human body like head, legs. • Origin and spread of Kiswahili • Importance of Kiswahili to Ugandans and other East African countries	
General Vocabulary	The learner: • Names domestic animals, birds and insects in Kiswahili. • Mentions the days of the week, names the months of the year and tells the correct dates.		• Names of domestic animals like goats, sheep, cows, pigs, rabbits, dogs, cats • Names of domestic birds like ducks, turkeys, hens, • Names of insects like mosquitoes, flies cockroaches • Month in a year, days of the week, dates and telling time • Names of objects like doors, windows • Common usage of Kiswahili, home and garden activities • Common mistakes to be avoided	10 Hours

Professional related vocabularies	The learner: • Identifies and names the tools, materials, and equipment used in ICT. • Refers to officers in ICT by their titles. • Describes the tasks performed by different ICT officials.	•	• Names of tools, materials, and equipment used ICT. • Titles of officers in ICT. • Tasks performed by ICT officers	06 Hours
Customer Care and Language	The learner: • Applies the terms used in ICT. • Expresses confidently in public. • Welcomes, offers to assist, and appreciates the assistance provided by others. • Advertises the products in Kiswahili. • Negotiates for	•	• Common Terminologies used in records. • Public expression (welcoming, asking, thanking) • Providing the available information • Persuasive language • Advertising of products • Negotiating for • better terms	10 Hours

	better business terms in ICT.			
Total Module Duration				56 Hours

ASSESSMENT STRATEGIES OF THE MODULE

This module will be assessed through evidence based on the trainee's practical work, assignments, tests and final assessment against the set performance standards. Their relative contribution to the final grade is as below:

Requirement	**Contribution**
Assignment	5%
Tests	10%
Practical	25%
Final Assessment	60%

SAMPLE PROJECTS

- Software kiosk
- Stationery shop
- Telephone services
- Development of Posters and Post cards, Corporate Identity Cards,
- Brochures and Report cards
- HTML Web programming
- Web editing
- Designing computer graphics and editing Photos
- Web Editing
- Designing computer Graphics and editing photos
- Designing Static Web pages
- Setting and maintaining a LAN